



# **Pedagogical Approach to Digitalisation in Education**

*Institutional Concepts, Best Practices, Blueprint, and Case Studies*

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## Literature review

### 1. Introduction

#### 1.1 New pedagogical strategy in the New Normal

The Covid-19 pandemic has presented an opportunity for rethinking assumptions about education in general. In the light of the general crisis the pandemic caused, especially when it comes to the so-called emergency remote teaching (ERT), educators from all grades and contexts experienced the necessity of rethinking their roles, the ways of supporting the students' learning tasks and the image of students as self-organizing learners, active citizens and autonomous social agents (Chrysi Rapanta, Luca Botturi, Peter Goodyear, Lourdes Guàrdia, Marguerite Koole, 2021 - Balancing Technology, Pedagogy and the New Normal: Post-pandemic Challenges for Higher Education). The Covid-19 pandemic has caused a rethinking of pedagogies, designing of courses, teaching and the competences that educators should acquire, learning, assessment and recognition.

To facilitate student learning outcomes, teachers usually combine their understanding of the content area (subject matter) with the knowledge of pedagogy (how to teach) into their instructional practice. This consideration is even more essential for virtual education, where it is important to carefully direct the integration of technology based on the teachers' knowledge of pedagogies and content. Therefore, online teaching requires some skills to support a teacher's role as an intersection point for technology, pedagogy, and content. To provide quality online learning opportunities to students, the primary responsibility of the teacher is to select and coordinate the technology, pedagogy, and content. Adopting new online teaching strategies linked to technology, pedagogy, and instructional design may require teachers to undergo some key changes and away from what have experienced during offline teaching (Arnab Kundu and Tripti Bej, 2021 - COVID 19 response: An analysis of teachers' perception on pedagogical successes and challenges of digital teaching practice during new normal). This report aims to analyze how education has changed, giving the tools and underlying the competences that management staff, teachers and students should acquire for more inclusive and effective digital education.

#### 1.2 New Learning and teaching opportunities

While the basic principles of curriculum preparation and development used in face-to-face classes are still applicable to fully online and blended classes, the introduction of an online component to a class or unit of study adds an extra layer of complexity. However, it also offers an opportunity for students to interact and learn in ways that traditional face-to-face teaching can't offer. How students learn in an online context is different to that of the face-to-face environment and careful consideration and more articulated planning are required to ensure a student's online learning experience is effective, engaging and aligned with the expected learning outcomes (Karin Watson, Learning to teach online). The use of technology is increasingly offering new learning and teaching opportunities to students and teachers, such as increased flexibility with time and physical location, and the ability to access a wide range of rich online resources. The reasons for introducing technology into the learning environment, and the purpose that it is intended to serve, needs to be carefully considered and articulated as part

of the planning of an online or blended class. Technology should not be the main focus of the process, but rather a component which enhances the learning and teaching experience, and which is carefully integrated into the curriculum planning (Karin Watson, Learning to teach online).

## 2. Design

### 2.1 Structure of innovative teaching

To be functional, innovative teaching should take into consideration some aspects.



Figure 1 Learning design components for the post-Covid era (Christina Rapanta, Luca Botturi, Peter Goodyear, Lourdes Guàrdia, Marguerite Koole, 2021)

- **Flexibility:** as mentioned in the paper *“Postdigital Science and Education”*, The design of the learning environments must be flexible, in the sense that it is consistently transformed according to the contextual learning conditions, either being conducted face-to-face or delivered remotely, or with regard to students’ needs and expected learning outcomes. Flexibly designed learning environments allow space for personalization of the curriculum. This can be done through giving space to students to have a say in their own learning process, for example with a greater variety of courses, in different modalities and implementing different methods. At the same time, an increased personalization implies a greater flexibility, as the instructional methods must be continually adjusted to learners’ level, interests and needs.
- **Empowerment:** Granting students a voice and a place in their learning process leads to a greater sense of responsibility, which in turn, if assumed by the students (and experience tells it will), can lead to a greater motivation and self-regulation. For this to take place, students’ potential must be explored not only on the basis of what they want, but also and mainly on the basis of what they need and do. For this, monitoring students’ progress through continuous, evidence-based assessment methods is an important asset, and it is a wiser investment than proctoring systems to make exams ‘safe’. Instead of controlling what students do, we must create the right conditions and opportunities for them to do better (Christina Rapanta, Luca Botturi, Peter Goodyear, Lourdes Guàrdia, Marguerite Koole, 2021).
- **Professionalization:** as mentioned in the paper *“Postdigital Science and Education”*, the concept of professionalization refers to teachers’ and students’ attitudes within learning situations, and also to the curriculum designs that help create those situations. For teachers to behave like professionals, and therefore to be considered successful teachers, their subject

matter, didactic and pedagogical competence is not enough. They must also have the critical-reflective attitude to know how and why they do what they do, and the systemic competence to adapt to changing circumstances.

- **Strategic Decision-making:** Faculty teachers are not always the ones who make the decisions regarding curriculum and assessment design. Careful strategic planning on the part of the HE institutions is now more necessary than before.

## 2.2 Instructional design

Innovative digital-based teaching cannot ignore what is commonly defined as **instructional design**, that is to say a set of operative tools which can really help teachers to renew their didactic approach, by adapting it to the rising needs and suggestions stemming from the audience of participants.

As a matter of fact, innovative digital-based teaching cannot disregard what is commonly defined as **instructional design**, that is to say a guided process combined with operative tools which can really help teachers to renew their didactic approach, by adapting it to the rising needs and suggestions stemming from the audience of participants. As a matter of fact, traditional teachers have few opportunities to deepen methodologies for instructional design, since their pedagogy is mainly bound to the direct experience, an approach which cannot work effectively when at stake is Web-Enhance-Learning (WEL) where, for each training goal, it is essential to devise the most effective strategy to achieve it with the support of the new technologies. When dealing with instructional design, what really matters is the need to give meaning to the recourse to web-based educational resources as a tool for improving the process of teaching and learning. In such circumstances, traditional approaches are not enough, because online training must take into account new and peculiar dynamics as:

- the particular kind of interaction between the the different stakeholders involved in the process;
- the teacher's position and role within the digital classroom;
- the management of technical issues, as students' access to digital facilities and resources.

Moreover, when we speak of WEL courses, we refer to a mix of different project activities which are related with:

- the training path;
- the selection of didactical materials;
- the online activities;
- the class-based activities (in the event of blended solutions);
- the set-up of virtual environments consistent with the didactic activities and the expected goals

Digital training implies therefore a wide array of new activities which substantially converge into two main blocks: the full-fledged instructional design and the design of communication architecture for developing and managing the online training activities (Trentin, 2008). Over the years, different definitions of instructional design have been given, as well as different models have been provided in order to steer its implementation (Gustafson, 1994) (Gustafson et al., 2002). As a whole, different models are linked by some recurring traits as: the setting of training goals, the definition of contents' structure, the shaping of didactic strategies, the determination of delivery methodologies as well as of the evaluation criteria. What distinguishes one model from the other is the way in which such elements are blended.

A notorious landmark for the instructional design activities (ID) is the [ADDIE Model](#) (acronym for Analyze-Design-Develop-Implement-Evaluate) (Andrews e Goodson, 1980). ADDIE can be presented as a systematic approach to ID, a sort of umbrella under which a wide range of models is gathered. As pointed out in the picture below, ADDIE forecasts the articulation of ID process in five principle phases:

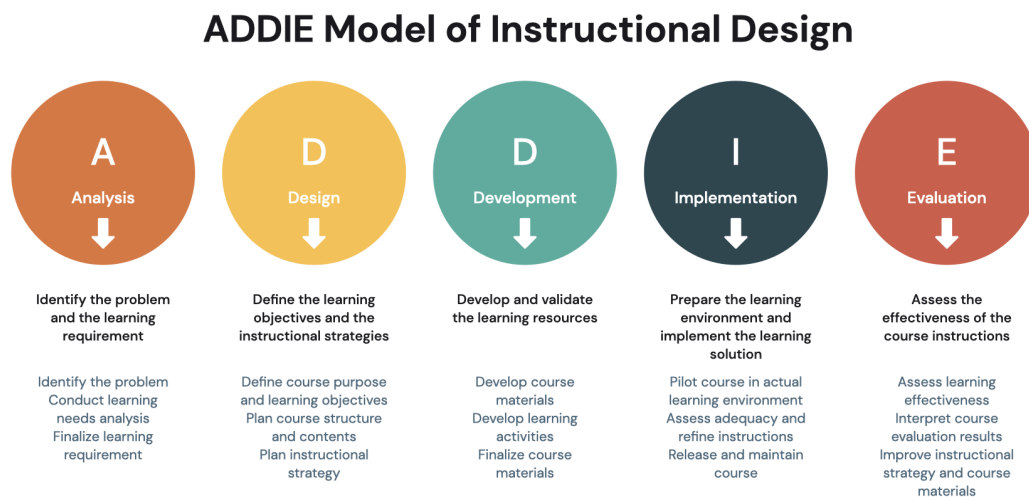


Figure 2 The ADDIE model for instructional design activities

- **Analysis:** this first step can be defined as a sort of recognition about whatever can offer useful insights for the subsequent design phase, as the collection of training needs and its goals, the users' profiling and expectations' analysis, the infrastructural, technological and economic constraints which can influence the instructional design process.
- **Design:** along with the stages of development and implementation, it represents a key factor which can lead to the success or failure of a training path. During the design phase, attention should be targeted at training objectives, at the methodologies for measuring their achievement as well as at the didactic strategies through which those objectives are pursued.
- **Development:** this is the phase in which the course is given operation, figuring out the activities, arranging the training and evaluation materials, setting a timeline for the delivery, and designing the organizational layout of the course. In this frame, it is usually foreseen the search for available didactic materials as well as for eventually available online resources (as OERs). This is the stage in which the development of e-contents is usually provided, apart from networked collaborative learning (NCL), based on collaborative strategies, where e-contents generation is not so crucial (Trentin, 2010).
- **Implementation:** design and development are followed by the implementation/delivery of the training course, a stage in which students benefit directly and autonomously from the resources at their disposal. Conversely, in a networked collaborative learning course, this phase stands out for the most intensive social interaction among students, teachers, tutors...It is the moment in which designers (teachers) e users (students) can interact on the same floor, giving to the former the possibility to adapt parts of the training contents to the specific needs which could eventually arise during the delivery in a sort of "adaptive design".

- **Evaluation:** the evaluation phase can be regarded as cross-sectional, affecting both the design process as a whole and the delivery. As far as the design process is concerned, evaluation refers to the ongoing assessment of what is defined and developed while the course takes its shape, while the impact on delivery is bound to the level of appreciation and efficacy reported by the participants. The assessing activities carried out during the delivery are determinant to point out enhancement opportunities for the subsequent edition.

Although ADDIE phases may appear as sequentially articulated, every ID process is substantially iterative since the last steps influence the review of the previous ones, starting from the evaluation phase which is intrinsically cross-sectional. Each phase must be developed in a different manner by reason of the adopted didactic model, whether traditional, web-based or blended. In the specific case of WEL, each phase will follow different criteria depending on the fact that the chosen approach is content-driven or collaborative.

### 2.3 New media for new pedagogies

For a long time, didactic pedagogy has been regarded as about imparting knowledge. In this frame, the main requirement for the lecturer was the possession of that knowledge. For some time, this has been the prevailing view of university teaching, and therefore academics are appointed on the basis of their qualifications in subject matter knowledge. Of course, “imparting knowledge” matters, but it has not usually been a very successful teaching aim. The reason is that the simple delivery of knowledge does not take into account the way in which students learn, by creating the best possible conditions for them to fruitfully and effectively acquire and develop new knowledge. New media and new technologies have determined a radical shift of paradigm, making the higher education system less elitist and focusing its attention on a different approach to teaching, rather than on a list of topics and contents to be delivered in a traditional up-down manner (Laurillard, 1993). The onset of the digital era, putting in the middle pedagogies and teaching methodologies, has created the favorable conditions for a students-centered approach where the aim of teaching is to make student learning easy and possible (Ramsden, 1995), but we are still far from properly defining proper practices and digital tools for teachers.

In general, “making student learning possible” goes along with more responsibility on teachers’ side as well as on their capacity to effectively design training courses which result from combining four different priorities:

- desired learning outcomes (what?)
- rationale of learning (why?)
- selected relevant activities for achieving the expected outcomes (how?)
- supporting technological tools

In a digital environment, teachers are required to better know how students learn and what enables this knowledge process. Provided to be framed in a pedagogical horizon, taking into consideration outcomes, rationale of learning and activities, new technologies turn out to be a powerful instrument for promoting and enhancing students’ learning, making it not just easier, but also more effective.

In the [table](#) hereafter, you will find a matrix about this new kind of learning process crossing outcomes, rationale, activities and technological tools/new media, highlighting their interconnections and paving the way for a new role of teachers in digital-based contexts.



Desired learning outcomes (What?)	Rationale (Why?)	Relevant activities (How?)	New media and technological tools
<ul style="list-style-type: none"> <li>● Information literacy</li> <li>● Global practice</li> <li>● Digital literacy</li> <li>● Ethical practice</li> <li>● Preparation for success</li> </ul>	<ul style="list-style-type: none"> <li>● Exposure to, awareness of contribute to external:               <ul style="list-style-type: none"> <li>- activity</li> <li>- conversation</li> <li>- resources</li> <li>- techniques and approaches</li> </ul> </li> <li>● appropriate referencing</li> <li>● managing information load</li> </ul>	<ul style="list-style-type: none"> <li>● Multi-dimensional evaluation</li> <li>● Sharing and reviewing online resources</li> <li>● Connecting with outside experts/communities</li> <li>● Check for plagiarism</li> <li>● Media making/mashups</li> <li>● Digital storytelling</li> <li>● Copyright/Creative Commons discussions</li> <li>● Activities relevant and authentic to discipline</li> <li>● Embedded activities for generic attributes</li> <li>● Contextual prompts to evaluate sources</li> </ul>	<ul style="list-style-type: none"> <li>● RSS feeds/aggregators</li> <li>● Blogs</li> <li>● Turnitin</li> <li>● Slide Share</li> <li>● YouTube, the Box</li> <li>● Podcasting</li> <li>● Library</li> <li>● Blackboard Collaborate</li> </ul>
<ul style="list-style-type: none"> <li>● Self-directed learning</li> <li>● Reflective practice</li> <li>● Engaged learning</li> <li>● Co-learning</li> <li>● Quality learning environment</li> </ul>	<ul style="list-style-type: none"> <li>● Negotiate understanding</li> <li>● Feedback on the course</li> <li>● Reflection on learning</li> <li>● Global practice</li> <li>● Consistency of experience</li> </ul>	<ul style="list-style-type: none"> <li>● Problem/case-based learning</li> <li>● Flexible access to material</li> <li>● Project planning and management</li> <li>● Student self-tests</li> <li>● Teacher (and</li> </ul>	<ul style="list-style-type: none"> <li>● Wiki</li> <li>● LMS groups (Moodle)</li> <li>● Quiz/survey</li> <li>● Recorded lectures</li> <li>● YouTube, the Box</li> <li>● Podcasting</li> <li>● Choice of</li> </ul>



<p>and experience</p>	<p>(equity)</p>	<p>technology) as facilitator of learning</p> <ul style="list-style-type: none"> <li>• Choice of modes and activities</li> <li>• Access to technology (e.g. mobile devices)</li> <li>• Agreed code of conduct</li> </ul>	<p>(ability to explore) media</p> <ul style="list-style-type: none"> <li>• Online resources</li> <li>• Mobile learning (smartphone, tablet)</li> <li>• Library</li> <li>• Lesson</li> <li>• Blackboard Collaborate</li> </ul>
<ul style="list-style-type: none"> <li>• Giving and receiving feedback</li> </ul>	<ul style="list-style-type: none"> <li>• Multiple perspectives</li> <li>• Feedback on performance</li> </ul>	<ul style="list-style-type: none"> <li>• Collaborative writing</li> <li>• Group negotiation and planning</li> <li>• Assessment of teams' work</li> <li>• Review (e.g. group work)</li> <li>• Publishing</li> <li>• Reflection</li> </ul>	<ul style="list-style-type: none"> <li>• Wiki</li> <li>• Blogs</li> <li>• Discussion forum</li> <li>• Peer review (LMS: Moodle)</li> <li>• Blackboard Collaborate</li> </ul>
<ul style="list-style-type: none"> <li>• Working in teams</li> <li>• Collaborative practice</li> </ul>	<ul style="list-style-type: none"> <li>• Negotiate understanding</li> <li>• Multiple perspectives (for teacher) management of group work</li> <li>• Digital literacy</li> <li>• Inclusivity (e.g. NESB)</li> </ul>	<ul style="list-style-type: none"> <li>• Collaborative writing</li> <li>• Group negotiation and planning</li> <li>• Project planning and management</li> <li>• Problem/case-based learning</li> <li>• Assessing team contribution</li> <li>• Media based projects</li> <li>• Variety of communication styles</li> </ul>	<ul style="list-style-type: none"> <li>• Wiki</li> <li>• Blogs</li> <li>• LMS groups (Moodle)</li> <li>• Peer review (LMS: Moodle)</li> <li>• Google Docs</li> <li>• Blackboard Collaborate</li> <li>• Moderated discussion</li> </ul>



		supported	
<ul style="list-style-type: none"> <li>● Critical reviewing</li> <li>● Critical thinking</li> <li>● Independent learning</li> </ul>	<ul style="list-style-type: none"> <li>● Negotiate understanding</li> <li>● Multiple perspectives</li> <li>● Feedback</li> <li>● Practice of: - critical reviewing - critical thinking</li> </ul>	<ul style="list-style-type: none"> <li>● Reflecting</li> <li>● Debating</li> <li>● Reviewing</li> <li>● Social knowledge building</li> <li>● Review of/commentary on online material</li> <li>● Give and receive feedback</li> </ul>	<ul style="list-style-type: none"> <li>● Blogs</li> <li>● Discussion forum</li> <li>● Blackboard Collaborate</li> <li>● Voice Thread</li> <li>● YouTube, the Box</li> <li>● Podcasting</li> <li>● RSS</li> <li>● Peer review (Moodle Workshop)</li> </ul>
<ul style="list-style-type: none"> <li>● Synthesis of learning</li> <li>● Apply learning (at high level)</li> </ul>	<ul style="list-style-type: none"> <li>● Able to solve new problems</li> <li>● Application of knowledge in integrated way</li> </ul>	<ul style="list-style-type: none"> <li>● Experience "authentic" practice</li> <li>● Integrative (could be group) project</li> <li>● Problem/case-based learning activities</li> </ul>	<ul style="list-style-type: none"> <li>● Authentic voice via video/audio</li> <li>● Blackboard Collaborate</li> <li>● Simulations e.g. virtual experiments</li> <li>● Animations</li> <li>● Group tools</li> </ul>
<ul style="list-style-type: none"> <li>● Written communication</li> </ul>	<ul style="list-style-type: none"> <li>● Negotiate understanding</li> <li>● Contribute to external: - activity - conversations - resources</li> <li>● Appropriate referencing</li> </ul>	<ul style="list-style-type: none"> <li>● Reflecting</li> <li>● Debating</li> <li>● Reviewing</li> <li>● Publishing</li> <li>● Checking for plagiarism</li> </ul>	<ul style="list-style-type: none"> <li>● Blogs</li> <li>● Discussion forum</li> <li>● Slide Share</li> <li>● Twitter/Yammer</li> <li>● RSS</li> <li>● Turnitin</li> </ul>
<ul style="list-style-type: none"> <li>● Oral communication</li> <li>● Presentation</li> </ul>		<ul style="list-style-type: none"> <li>● Sharing audio/video material</li> <li>● Presenting</li> </ul>	<ul style="list-style-type: none"> <li>● Voice Thread</li> <li>● YouTube, the Box, podcast)</li> <li>● Slide Share</li> </ul>

<p>skills</p> <ul style="list-style-type: none"> <li>● Language proficiency</li> </ul>		<ul style="list-style-type: none"> <li>● Digital storytelling</li> <li>● Audio/video discussion and feedback</li> </ul>	<ul style="list-style-type: none"> <li>● Podcasting</li> <li>● Blackboard Collaborate</li> </ul>
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Source: [Selecting technologies, UNSW Sidney](#)

## 2.4 The importance of scaffolding in design effective courses

Instructional scaffolding or simply known as **scaffolding** in education is defined as a guidance or support from teachers, instructors or other knowledgeable persons that facilitate students to achieve their goals in learning. Conceptually, scaffolding means providing students with instructions during the early stage of learning before slowly shifting the responsibility to them as they develop their own understanding and skills. As technology extends learning from classroom to learning communities, the same goes to the concept of scaffolding. The scaffolding is no longer implemented via face-to-face instruction that literally exists between a teacher and students in a classroom. Currently, the form of instructions that emerges between teachers and students is mediated through technology and the learning communities exist in the online settings. Thus, it is important to acknowledge the suitable form of support required for the students, especially in an online learning environment (Jumaat, Tasir, 2014).

Scaffolding or instructional scaffolding has been widely studied in the past (Verenikina, 2003). The term is better known as a critical component that facilitates students in learning (Chi *et al.*, 2001). However, as technology extends learning beyond a classroom setting, the concept of scaffolding becomes diverse. No longer is the method confined to face-to-face interaction, it even implies students thousands of kilometers away from their colleges. Scaffolding can now be mediated by technology, and the interest for such integration has been increasing (Reiser, 2004).

The concept of scaffolding originates from the work of Wood, Bruner and Ross in 1976 (Wood *et al.*, 1976). It relates to Social Constructivism Theory pioneered by Lev Vygotsky and his popular concept known as the **Zone of Proximal Development (ZPD)**. Vygotsky's Social Constructivism suggests that social interactions among teachers, peers, tutors, parents or instructors contribute to the development of an individual learning process (Vygotsky, 1978). In other words, the theory professes that such interactions enable students to learn a new concept effectively (van de Pol, 2010).

The term 'scaffolding' was borrowed from the construction field (scaffold is a temporary structure that supports building). In education, scaffolding is a concept bound to teachers instructing students in the early stages of learning, and gradually lessening their support as the students gain mastery (Palinscar, 1986). This approach can reduce the difficulty of complex learning and, at the same time, helps students focus on constructing knowledge and higher-order demands like thinking critically (Way and Rowe, 2008). Traditionally, instructions were imparted face-to-face by teachers but, as the World Wide Web makes its way into education, the concept applies to the technology environment as well. As McLoughlin emphasized, "the concept of scaffolding needs to be redefined into the context where the teacher is not present, as in the online environment" (McLoughlin, 2004).

Scaffolding in an online learning environment refers to the support provided by teachers or instructors via technology. These teachers will use various technological tools and resources that could assist them in teaching. Students gain equal benefits too: they could capitalize the virtual learning environment to communicate with peers, while having their progress monitored regularly by their teachers. Nevertheless, such a method requires a structured guideline in order to avoid students' frustration should they fail to learn. This necessitates online educators to conduct scaffolding properly in line with students' needs, as well as forms of support that can adequately enhance the teaching and learning process. This support could be in the form of software or web-based tools or virtual learning objects.

Software-based tools are developed as standalone software built into the tools, tasks and interfaces (Quintana *et al.*, 2004). These software provides appropriate scaffolding strategies that can engage students in their tasks. Web-based tools on the other hand, are internet-based applications or websites used by teachers as a platform to support students in learning; they include for example, wikis, blogs and social networking sites. Virtual learning objects include 3D-animation cartoons or avatars which are used not only to assist, but to engage students in learning.

In the [table](#) here below you will find a synoptic overview regarding types of scaffolding as resulting from the use of different digital support forms (software-based, web-based and virtual learning object).

Support form	Scaffolding type
Virtual Object (3D animation expert cartoon)	<ul style="list-style-type: none"> <li>● Metacognitive scaffolding</li> <li>● Conceptual scaffolding</li> <li>● Strategic scaffolding</li> <li>● Procedural scaffolding</li> </ul>
Software-based tool	Metacognitive scaffolding
Web-based tool	Procedural scaffolding
Software-based tool (Ecolab)	Metacognitive scaffolding
Virtual learning object (avatar)	Metacognitive scaffolding
Web-based tool (Knowledge Community)	<ul style="list-style-type: none"> <li>● Metacognitive scaffolding,</li> <li>● Strategic scaffolding</li> </ul>
Software-based tool (PLATO)	<ul style="list-style-type: none"> <li>● Question prompt</li> <li>● Metacognitive scaffolding</li> </ul>
Web-based Tool (Wikis)	<ul style="list-style-type: none"> <li>● Conceptual scaffolding</li> <li>● Procedural scaffolding</li> <li>● Metacognitive scaffolding</li> <li>● Strategic scaffolding</li> </ul>

<p>Web-based tool (Online Forum)</p>	<ul style="list-style-type: none"> <li>● Technical support</li> <li>● Content support</li> <li>● Procedural support</li> <li>● Metacognitive support</li> </ul>
<ul style="list-style-type: none"> <li>● Web-based tool</li> </ul>	<ul style="list-style-type: none"> <li>● Written prompts</li> <li>● Argumentation template</li> <li>● Questioning and Modeling</li> </ul>

Source: [Jumaat and Tasir, 2014](#)

Based on the results rising from the literature, four main types of scaffolding can be identified:

- procedural scaffolding;
- conceptual scaffolding;
- strategic scaffolding;
- metacognitive scaffolding.

According to Hannafin, Land and Oliver (Hannafin *et al.*, 1999), these are structures that appropriately support students' learning. Procedural scaffolding assists students in using available tools and resources. Conceptual scaffolding helps students to decide what to consider in learning (Hill and Hannafin, 2001), guiding them to prioritize fundamental concepts. Strategic scaffolding suggests alternative ways to tackle problems in learning. Finally, metacognitive scaffolding guides students on what to think during learning (Hannafin *et al.*, 1999).

Among the four types, **metacognitive scaffolding** is the most explored by researchers. It promotes higher order thinking (Way and Rowe, 2008), assisting students to reflect on what they have learnt (self-assess) and assessing their progress (Teo and Chai, 2011).

Since technology changes rapidly, the forms of support provided to online learners must be adapted consequently. Instructors have been using web-based tools, such as wikis and blogs, as platforms to support and discuss with students. Software-based tools have been used in many studies as a form of support, since the developed software is like an automated assistance agent that can assist learners by engaging them with strategies and structures. Virtual learning objects, such as 3D-animation, finally, have been exploited not only to assist, but above all to engage students in learning.

The importance of scaffolding in an online setting has been widely investigated by the literature, regarding in particular the contribution it can give to improve and enhance students' learning experience. Reingold, Rimor and Kalay (Reingold *et al.*, 2008) recommended supporting students to experience a reflective learning process as this contributes to their experience as a community of learners with a common task. Additionally, Tiantong and Teemuangsai (Tiantong and Teemuangsai, 2013) found that scaffolding is suitable for active learning. All these findings are consistent with the results reported by Huang, Wu and Chen (Huang *et al.*, 2012), who found more active participation and meaningful negotiations in the groups subject to scaffolding. Previous studies have also reported that metacognitive scaffolding is generally preferred, since it encourages students in reflecting their tasks and, at the same time, contributes to their experience as a community of learners with a common task. This method is therefore to be regarded as the most effective in an online learning environment, because it supports learners by assisting individual learning management and by guiding appropriate thinking during learning activities (Theo and Chai, 2011).

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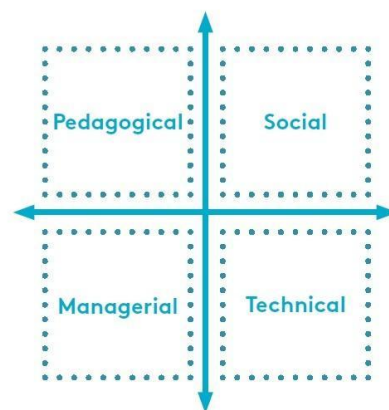
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## 3. Teaching

### 3.1 The new teaching framework in a digital/blended learning setting

The Covid-19 pandemic has forced education into a whirlwind computerization, which has revealed some critical issues as well as new opportunities. What we have understood, during and after this period, is that teachers should play different roles for what concerns pedagogies and the acquisition of new digital ways of teaching. Since there is the necessity for teachers to oversee more and different dimensions within the teaching and learning process mediated by digital technologies, it is important to understand which are those dimensions and what each of them entails.



According with Ilgaz and Gulbahar (2015), the definition of these four dimensions are the following:

- The **pedagogical** dimension refers to pedagogical and assessing expertise. Teachers in the digital world need to be experts in theoretical and practical pedagogical knowledge, which will allow them to make decisions and act effectively on issues related to student teaching and learning (how to design the course according to the learning goals, which pedagogies to use according to the specific learning settings and goals, which digital tools are most suited to the concerned pedagogy and learning goal, how to organize the course schedule, etc) , and the most appropriate strategies for evaluating learning processes and results. This dimension encompasses the ability of teachers to use digital tools and resources to enrich classical pedagogical models, to be able to identify and select teaching strategies that capitalize on the students' digital potential and abilities to enhance the classroom and learning experience, to align assessment methods to learning goals, pedagogies and tools in use.
- The **social dimension** refers to interpersonal and communication skills with the goal to make students feel closer despite the physical distance (perceived proximity). Teachers should encourage learners to participate actively and to communicate in synchronous and asynchronous mode fostering interactivity, peer learning and co-creation.
- The **managerial** dimension refers to administrative and organization skills. The vast number of online lessons, videos, simulations, and activities, combined with the pressure to get started, have left many teachers feeling overwhelmed. It is therefore important for teachers to develop the capacity to plan, orchestrate and manage the new learning programs made of a vast array of digital and physical spaces and tools and to ease the access for students offering clear guidelines and instructions on what to do and how to participate. Ideally, school

administrators or principals can provide guidance on selections and uses. One suggestion is for teachers to leverage whatever resources their schools already have (Julie Young and William Donovan, 2020).

- The **technical** dimension refers to technological literacy. As said the new digital learning environment is composed by an array of different environments and tools, being them learning management systems (i.e. Moodle, Google Classroom, etc.) where the course, teaching material (OERs, teachers' videos and material) and students' interactions are hosted and web tools (i.e. Mentimeter, Kahoot, padlet, etc.) teachers might decide to use during the course to activate students and to foster peer-learning and collaboration/co-creation process. Teachers unfamiliar with such technologies should be allowed time to learn how to use them and practice using them and reviewing the content to avoid problems when they go live (Julie Young and William Donovan, 2020). Furthermore, students should be supported in properly using the concerned technologies.

### 3.2 The social role and relationship between teachers and students

The social dimension takes an important role in the new learning environment since it is conditional for students' engagement in the learning process. Teachers should organize pedagogies in a different way respecting the pre-Covid period taking into consideration, according to Pallof and Pratt (2007, 2011), four tasks:

- Gauge the students' readiness to learn: teachers should help students during the transition to the digital/blended education giving them clear instructions to follow the lessons trying not to lose them.
- Get participants engaged with each other through online activities that depend on collaboration fostering the communication with interactive activities removing the uncertainty given by distance.
- Fill the gaps making sure to wave and comment on participants' postings speaking about their messages highlighting key issues to encourage additional contributions.
- Organize and synthesize the knowledge generating new propositions and offering a structure for collecting relevant messages.

The social function is typically employed to promote a friendly environment and community feelings to support student cognitive learning processes. Such social functions include developing harmony, group cohesiveness, virtual proximity and collective identity. Online social roles require instructors to develop nurturing skills by encouraging participation and co-creation, giving ample feedback and reward, attending to individual concerns, and using a friendly, personal tone (Kerr, 1986).

In a learning community, participants have a strong sense of belonging and are ready and willing to contribute to the knowledge building of a larger community. Not only do instructors need to establish a leadership role in nurturing community, they also are expected to model the social roles to online students to motivate and engage students in a community of inquiry (Anderson, T., L. Rourke, W. Archer, and R. Garrison, 2001). Studies have found that a weak sense of social cohesiveness could result in increasing the drop-out rate of online students who feel isolated and stressed (Eastmond, 1995).

Though social roles have been widely cited in recent research, studies have indicated that instructors who are new to teaching online may have difficulty getting used to new social roles. Conrad's (2004) study noted that inexperienced online instructors often lacked essential social skills and preferred personalized communication instead of taking leading roles in establishing a wider community; it may be difficult to understand the importance of social roles when instructors discover just how task-oriented online students are (Bonk, 2000).

One of the greatest challenges for online learning is the ability to build a more personal relationship between educator and student. The "impersonal nature" of the online environment poses a great difficulty for building social rapport (Xiaojing Liu, Curt J. Bonk, Richard J. Magjuka, Seung-hee Lee, Bude Su, 2005).

Many instructors associate the low social presence in their courses with the limitations of existing technology that is unable to project participants' identity or personality into an online course. To address this issue, many organizations establish a policy to add at least one video introduction of the instructor in each course. (Xiaojing Liu, Curt J. Bonk, Richard J. Magjuka, Seung-hee Lee, Bude Su, 2005).

### 3.3 Student centered approach and active learning

When we think about the digitalization of education we must consider that Digital Learning can be accessed from numerous media. Educators need to rethink the way they teach, realizing new teaching methods focused on media and tools used by students.

Digital Learning is a teaching and learning process that utilizes information technology (in this case the internet) as an effective means and expands knowledge under the development of science in real time (Stewart-McKoy, 2024). The potential offered by ICT to spark knowledge co-creation process by students as a way for them to actively construct their own knowledge is at the core of the constructivism learning theory. It allows to switch the ownership of the learning process from the teachers to the students, with the advantage of empowering students and personalizing their learning experience.

The related pedagogical approach is based on the Online Collaborative Learning theory (OCL) which focuses on educational applications that facilitate the creation of ideas, the organization of ideas, and intellectual convergence through the internet. OCL theory consists of three intellectual phases:

- Generating ideas (GI)
- Organizing ideas (OI)
- Intellectual convergence (IC) (Mnkandla & Minnar, 2027)

According to this theory, teachers practices should evolve from simply transmitting knowledge to building a stimulating and conducive learning environment, made of a vast array of different resources and media combined with individual, co-operative and collaborative activities and assessment steps, allowing students to learn according to their interests and thanks to the collaboration and or cooperation with peers<sup>1</sup>.

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<sup>1</sup> <https://www.ijello.org/Volume5/IJELLOv5p091-109Koohang655.pdf>

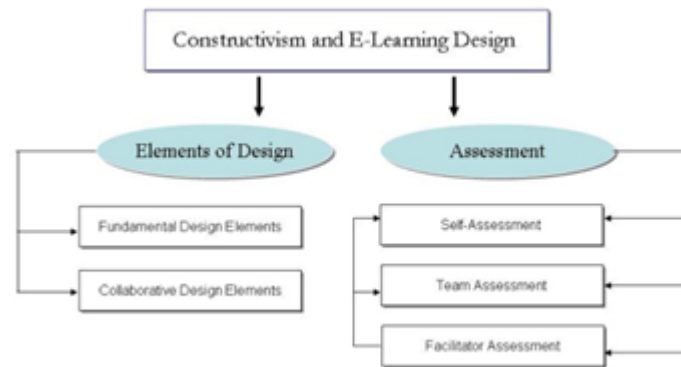


Figure 3 Teacher Innovations and Solutions for Online Learning Outbreak Period and New Normal (Nur Wakhidah, Erman Erman Astri Widyaningrum, Vera Nur Aini, 2021)

### 3.4 Content curation & content co-design

The teaching framework for operating in a digital/blended learning setting is increasingly marked by the emphasis put on activities of content curation and content co-design in which students, turning into “**prosumers**”, can play an active role as beneficiaries and co-designers/co-creators of contents. In its broadest sense, the concept of “content curation” is often referred to the need of managing a mass of information and data for training activities. Content curators can be then defined as those experts who spend time collecting and selecting contents, arranging them in a sequence that is appealing and helpful to guide people along a desired training path. Curation is more than a mere compilation or collection of links, consisting rather in providing contextualized training materials which offer to the trainees a complete and structured learning experience which can lead them towards a specific goal.

There are many benefits stemming from content curation. Apart from overcoming the need to create new contents, thereby reducing the development time, curation can help to better target specific audiences and needs and to personalize learning materials. Moreover, content curation offers the advantage of:

- being immediately useful, innovative and deliverable in real-time;
- offering high-valuable materials, enabling the participants to make more sense of a specific topic;
- stressing collaborative learning, discussion and sense of community;
- being accessible anywhere and anytime in a safe environment;
- spreading new methodologies and approaches from which specific targets can benefit.

As the concept of content curation has so far developed, so has the advice and intelligence with regard to undertaking it. To this aim, content curation experts generally agree on the need to preliminarily clarify the goals for the curated contents and to identify the available and suitable resources. A model which can be adopted is that of the “5 Cs” (Deschaine and Sharma, 2015):

- **Collect**, by gathering relevant resources, then review the collection, compare the existing resources and choose the most appropriate.
- **Categorize**, by refining the collection through identifying and reflecting on the relevance of each resource and its cohesion with the whole collection.

- **Criticize**, by determining the value of each resource by reviewing its quality, then remove any resources that do not meet the criteria for inclusion.
- **Conceptualize**, by organizing the resources within a framework, as this will provide a meaningful context for learners and others using the content collection.
- **Circulate**, by providing the curated collection through a content curation tool.

Regardless of the adopted model of content curation, to be remembered is the fact that this activity acts as an iterative process. Therefore, the information collection that results at the beginning will need to be refined on an ongoing basis as new resources are found and coherent contents are built around them. It will be up to the content curators to stitch together and annotate the materials in order to create a real story board, while summarizing single items, weaving pieces together, highlighting quotes or keywords and explaining the choice of a topic rather than another.

**Resources** are another pillar for an effective content curation/co-design activity. There are in general different kinds of resources on which content curation can draw. Open Educational Resources (OERs) can be regarded as the key-resource for contents’ curators and co-designers. OERs can be defined as materials that reside in the public domain or are under copyright which have been released under an open license which allows users to hold a copy, to re-use and share them for free. In most cases, these open licenses aim at promoting innovation through adaptation and re-mixing of contents by final consumers, who turn therefore into “prosumers”. These materials are commonly released in digital form to facilitate sharing and to make information available anytime and anywhere.

**Figure 8.1.** Categories of OER providers

Scale of operation	Large	<p><b>QUADRANT I</b> <b>Large-scale, institution-based</b> MIT OpenCourseWare UK Open University OpenLearn</p>	<p><b>QUADRANT III</b> <b>Large-scale, community-based</b> Wikipedia Connexions MERLOT WikiEducator</p>
	Small	<p><b>QUADRANT II</b> <b>Small-scale, institution-based</b> OpenER (Open University of the Netherlands) University of the Western Cape Free Courseware Project United Nations University OCV Klagenfurt OCV</p>	<p><b>QUADRANT IV</b> <b>Small-scale, community-based</b> OpenCourse Free Curricula Center LeMill</p>
		Institution	Community
Provider type			

Source: Adapted from OECD, 2007, p. 45.

*Figure 4: Categories of OERs providers (Source: OECD, 2007)*

OERs are a relatively new phenomenon which may be well seen as part of a larger trend towards openness in higher education, including more well-known and established movements such as Open Source Software (OSS) and Open Access (OA). In the matrix above you will find a brief [taxonomy](#) of OERs providers, distinguished by scale of operation and typology. But what is meant by “open” and what are the arguments for striving for openness? The term Open Educational Resources first came to use in 2002 at a conference hosted by UNESCO. Participants at that forum defined OER as: “The open provision of educational resources, enabled by information and communication technologies, for consultation, use and adaptation by a community of users for non-commercial purposes.” The currently most used definition of OER is: “Open Educational Resources are digitized materials offered freely and openly for educators, students and self-learners to use and re-use for teaching, learning and research.”

To further clarify this point, OERs are expected to include:

- **Learning content:** full courses, courseware, content modules, learning objects, collections and journals.
- **Tools:** software to support the development, use, re-use and delivery of learning content including searching and organization of content, content and learning management systems, content development tools and on-line learning communities.
- **Implementation resources:** intellectual property licenses to promote open publishing of materials, design principles of best practice and localization of content.

### 3.5 Data, learning analytics and privacy

Over the last several years, technology has become an essential tool to support students and instructors in creating more effective educational experiences. In this context, the propagation of online learning environments (e.g. learning management systems, student diaries, library systems, digital repositories and academic systems) has increased significantly, expanding the **data** generated about the educational process (Gaftandzhieva et al., 2020). These digital footprints can assist teaching and learning practices to foster better student achievements (Varanasi et al., 2018) and support teachers' practices (Jivet et al., 2018).

To exploit the potential of analysis of these data, **learning analytics** emerged as a field that focuses on collecting, analyzing and reporting information about learners and contexts in which learning occurs (Siemens and Gasevic, 2012). As a matter of fact, the use of learning analytics can bring concrete benefits for students, teachers and institutions. The large amount of students' data, such as demographic information, grades and students' behaviors, expands the possibilities of retention strategies and academic success, thus moving away from leveling by the average, to meet the needs of each student in a personalized and data-oriented way (Tan et al., 2016; Aguerrebere et al., 2017).

Learning analytics can be defined as "the measurement, collection, analysis and reporting of data about learners, learning environments and contexts to understand and optimize learning outcomes" (Siemens and Gasevic, 2012). Online learners leave behind data traces and learning analytics can gather these data from different sources and learners' activities, analyzing them and providing meaningful insights and visualizations for institutional managers, teachers and students (Gedrimiene et al., 2020). Learning analytics have been widely researched and used in higher education institutions, especially due to a level of maturity allowing them to adopt data analysis tools (Leitner et al., 2017; Waheed et al., 2018; Charitopoulos et al., 2020). However, despite some promising results, learning analytics do not have the same level of adoption in other educational sectors, such as high schools (Cechinel et al., 2020; Ifenthaler, 2021). That is a limitation, as the adoption of educational technology in these contexts has created environments in which rich information could be extracted from the generated data (Schmid and Petko, 2019).

This depends on the fact that higher education institutions are quick to adopt learning analytic tools as extensions of educational governance, while teachers in high schools are often skeptical of the utility of learning analytic tools and often resist their implementation through their academic practice (Brown, 2020).

There are many educational challenges in the high school context which involve all the stakeholders engaged in teaching and learning processes (Gaftandzhieva et al., 2020). Learning analytics can be used to address these challenges, starting from: school dropout (Khalil and Ebner, 2015), difficulty of collaboration among students (Berland et al., 2015), development of scientific argumentation and

writing (Lee et al., 2019; Palermo and Wilson, 2020) and development of computational thinking, which is an emerging ability for this age group (Grover et al., 2017). Teachers can be supported in understanding students' practices and classroom variations (Quigley et al., 2017) and in monitoring students' motivation levels (Aluja-Banet et al., 2019). Managers and decision-makers can use learning analytics to identify students who are in vulnerable situations, or not able to graduate on time (Aguiar et al., 2015; Jiménez-Gómez et al., 2015), and to develop curricula that meet students' needs and expectations (Monroy et al., 2013).

The systematic recourse to learning analytics cannot however ignore the account of some challenges which go hand in hand with the introduction of these techniques. The primary one is represented by the need to safeguard the students and trainees' **privacy rights**. A data-driven educational future has to navigate the stumbling blocks of privacy and data protection. Educationalists often find that dealing with these thorny issues is the prerogative of other professions such as lawyers or computer scientists and that pedagogical perspectives are not represented in the discourse. In preparing for the digital future of learning analytics, adaptive education, multimodal learning support and other data-driven approaches, educationalists need to develop what we could define an educational framework for privacy and data protection in this field.

Beyond the legal compliance, the question is whether there are also pedagogical ideas that should be brought to bear when designing privacy policies and solutions for educational big data management and whether these solutions can pave the way for more effective training and learning results. To lay the foundations for an educational framework regarding privacy in the educational big data management, the following questions should be regarded as a sort of road map:

- Is the reference to privacy an individual universal right to answer to data management and control challenges?
- Is "consent" the mechanism to use to get access to data?
- Is maintaining privacy a question of negotiation?

Privacy in educational settings cannot be regarded as privacy in corporate, commercial or national security contexts. As a consequence, consent cannot be considered in a traditional way as a general justification for collecting and processing of personal data unless the process is carefully staged. This means that processing learning analytics data can be possible only within a space of negotiation, based on ethics, law, national policies and pedagogies. In practice, the following principles can be considered as a starting point for the management of privacy rights in a digital educational setting:

- Privacy and data protection in learning analytics are achieved by negotiating data sharing with each student.
- Openness and transparency are essential and should be an integral part of institutional policies. How the educational institution will use data and act upon the insights of analysis should be clarified in close dialogue with the students.
- Big data will impact all society. Therefore, in negotiating privacy and data protection measures with students, schools and universities should use this opportunity to strengthen their personal data literacies.

### 3.6 New roles and new competences of teachers

National and European policies acknowledge the need to equip all citizens with the necessary competences to use digital technologies critically and creatively. The European Digital Competence Framework (DigComp), which was updated in 2016/17, responds to this need, by providing a structure which allows European citizens to better understand what it means to be digitally competent and to assess and further develop their own digital competence (European Framework for the Digital Competence, 2017).

On international, European, national and regional levels, there is consequently considerable interest in equipping teachers with the necessary competences to fully exploit the potential of digital technologies for enhancing teaching and learning and for adequately preparing their students for life and work in a digital society. Many European Member States have already developed, or are currently in the process of developing or revising frameworks, self-assessment tools and training programmes to guide teacher training and continuous professional development in this area (European Framework for the Digital Competence, 2017).

Educators are role models for the next generation. It is therefore vital for them to be equipped with the digital competence to drive this transition in the education sector. The European Framework for the Digital Competence for Educators (DigCompEdu) specifies these competences. DigCompEdu has become a widely accepted tool for measuring and certifying Digital Competence and has been used as a basis for teacher training and professional development across and beyond Europe (European Framework for the Digital Competence, 2017).

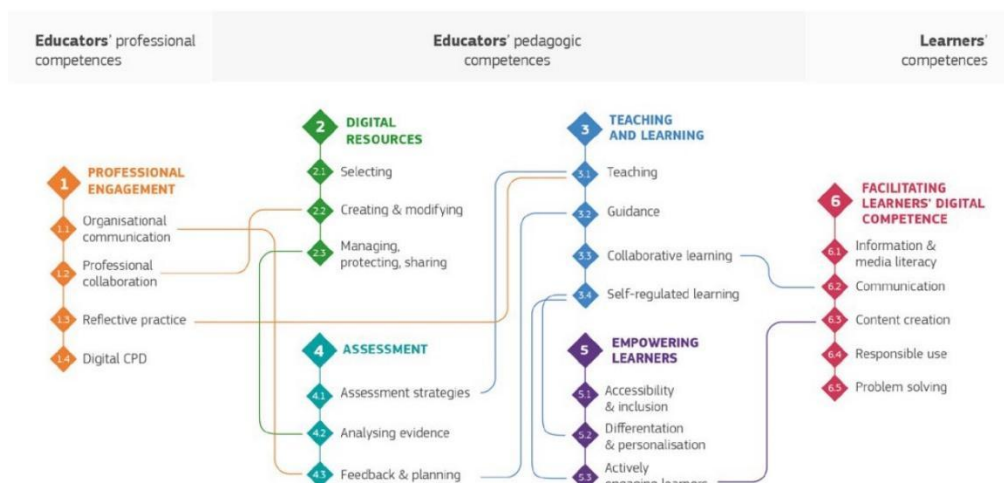


Figure 5: DigiCompEdu Competences and their connections

In EC's opinion the new competences that educators should acquire are six:

- **Professional engagement:** using digital technologies for communication, collaboration and professional development.
- **Digital resources:** sourcing, creating and sharing digital resources.
- **Teaching and learning:** managing and orchestrating the use of digital technologies in teaching and learning.

- **Assessment:** using digital technologies and strategies to enhance assessment.
- **Empowering learners:** using digital technologies to enhance inclusion, personalization and learners' active engagement.
- **Facilitating learners' digital competences:** Enabling learners to creatively and responsibly use digital technologies for information, communication, content creation, wellbeing and problem-solving.

Whilst the Framework provides a complete depiction of the skills teachers need to develop, it is not providing a taxonomy of the new roles teachers are supposed to play within the four teaching and learning dimensions (pedagogical, social, managerial, technical) presented in the previous chapter. Even if the literature provides different taxonomies of roles, we tried to offer below a transversal analysis of the different taxonomies, in relation to the four teaching and learning dimensions, and to complement it with the DigiCompEdu competences framework, in order to have convergence between skills and roles. This to ensure adequate knowledge and understanding of the new roles, and related areas of responsibilities, activities and skills, each of them should master. From knowledge and understanding comes the ability to correctly evaluate, staffing and upskilling actions in the schools in support of the digitization of the educational process, requiring the orchestration of specific and different skills and professional profiles.

- Content curator
- Virtual teacher
- Learning designer
- Information designer
- Mentor and guidance counselor
- Social facilitator
- Digital coach
- Manager
- Digital learning architect
- Technology coordinator
- Digital objects creator
- Digital instructor

## Taxonomy

### *Pedagogical dimension*

Dimension	Roles & description	Competences & skills
Pedagogical	<b>Content Curator</b>	Selecting and categorizing contents (ability to search for learning materials)
		Presenting contents in a coherent way, consistent with the learning goals
		Creating, modifying and updating training materials
		Managing, protecting, sharing
		Accessibility and inclusion
		Differentiation and personalization
		Content specific knowledge
	<b>Learning Designer</b>	Actively engaging learners
		Knowledge over modern didactic and pedagogical approaches (collaborative learning, self-regulated learning)
		Curriculum design
		Reflective practice
		Critical thinking skills
		Storytelling skills
		Knowledge of different (online) learning platforms and tools
Knowledge over different assessment techniques		



	<b>Information Designer</b>	Teaching
		Information organization
		Guidance
		Ability to use learning platforms, infographics, videos, presentations, manuals..
		Self-regulated learning
		General understanding of graphic design principles
		Visual thinking
		Knowledge on analysis and presentation of data
	<b>Mentor and guidance counselor</b>	Academic tutoring
		Assistance to students
		Academic advice to enrolled students

**Social dimension**

Dimension	Roles & description	Competences & skills
Social	<b>Digital facilitator</b>	Assessment strategies
		Interpersonal and intercultural skills
		Ability to stimulate social interaction and collaboration
		Creation of the “community sense”
		Reflective practice
		Capacity to promote effective



		communication, empathy and intimacy in online spaces	
		Creativity	
		Advanced communication skills	
		Classroom management	
		Knowledge and capacity to use modern didactical and pedagogical approaches (collaborative learning, self-regulated learning) and Knowledge of basic cognitive psychology	
		Diversity and inclusion	
		Pedagogical support	
		Knowledge of the virtual environment and tools	
		Facilitating the interaction with students within the virtual school program	
		<b>Digital coach</b>	Analyzing evidences
			Feedback and planning
		Domain-specific knowledge to be able to summarize and offer new directions	
		Advanced language skills	
		Knowledge of feedback techniques	
		Interpersonal communication skills	



		Summarizing and editing
		Ability to improve materials based on participants' contributions
		Providing resources
		Building relationships
		Motivating
		Creating interaction
		Problem solving
		Facilitating learning and reflection processes in a digital environment
		Capacity to meet different users' needs
		Identifying proper tools
		Formulating targeted action plans
		Providing feedbacks for improving the quality of learning experience

***Managerial dimension***

Dimension	Roles & description	Competences & skills
Managerial	<b>Manager</b>	Organizational communication
		Managing & administering the learning process
		Managing & administering the assessment process



		Professional collaboration: ability to work with educational system stakeholders, including executives, teachers, students and parents
		Reflective practice
		Time management skills
		Digital CPD
		Problem-solving skills
		Understanding of legal and regulatory aspects of data protection and privacy and their application in the educational context
	<b>Digital learning architect</b>	Digital environment design
		Participants' profiling
		Development of the organizational strategy for the use of learning technologies
		Designing user experience and facilitating participation
		Enabling different learning paths for participants

**Technical dimension**

Dimension	Roles & description	Competences & skills
Technical	<b>Technology coordinator</b>	Information and media literacy
		Communication



		Responsible use
		Problem solving
		Knowledge of the digital tools to be used
		Solution-oriented attitude
		Access to more specialized technical support
		Basic knowledge of regulatory rules for online courses, privacy, etc.
		Ensuring reliable and effective internet connection
		Technical support for educators
		Technical support for students
		Web development
		Managing platforms
		IT architecture definition
		Knowledge of security systems
		Understanding of legal and regulatory aspects of data protection and privacy and their application in the educational context (GDPR compliance)
		Knowledge of data analysis techniques for collecting, analyzing, and presenting information about learners and learning modes
Big data analysis and ability to collect data from multiple sources		

		and analyze it using data mining techniques
	<b>Digital objects creator</b>	Producing/selecting simple and complex digital learning objects
		Process design
		Combining “bite-sized” multimedia assets for meeting the customers’ needs

### 3.7 Overlapping between new roles and competencies

In school educational contexts, new roles encompass competencies and skills which are not always so clearly defined and sometimes overlap each other. Such is the case of social/digital roles as the digital facilitator/coach and the technology coordinator, both in charge of tasks which require digital, social and pedagogical skills. Not so different is the ambiguous relation between certain pedagogical and technical roles. An example of that are the roles of virtual teacher, which lies at the turn of more dimensions (typically the pedagogical and the technical one), and digital instructor.

The virtual teacher is generally responsible for:

- integrating technology with pedagogy and contents;
- managing online lessons, setting daily schedules and tools to monitor and evaluate the impact of training activities;
- combining face-to-face and virtual learning methods to be more effective and efficient;
- using social media to innovate pedagogies to stimulate students to be more active in the learning process;
- giving feedback and reward and fostering a student-centered approach.

The digital instructor, on the other side, is in charge of:

- encouraging participation;
- giving ample feedbacks and rewards;
- attending to individual concerns;
- managing organizational, procedural and administrative tasks associated with the digital learning environment;
- facilitating a smooth use of technology.

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eLead3.0Academy

## 4. Learning

### 4.1 From teacher to student-centered learning

In the continuity of learning in the classroom, the media has a very important role. For a shift in thinking towards an innovative and creative environment that supports the production of academic media that can be used together with the learning media movement in education. The typology of innovation has evolved from a structured and well-defined technological system of features to a system consisting of a large number of marketing design, organizational, and social features (Mushfi *et al.*, 2021).

Technological innovation as a force that drives social and organizational change, and perception of innovation as the ability of humans to create something new and different for their interests. The implication is in making innovative learning media for practical teaching, many key components must be taken into account when designing innovative media, including analytical thinking, critical thinking, sharing opinions, expressing rational ideas, and developing an open mind (Mushfi *et al.*, 2021).

Innovative educators have the opportunity to integrate face-to-face and digital learning models to advance learning models that are involved, effective, efficient and affordable in the 21st century. Students provide information about digital devices they have or have access to, and about using media and e-Learning tools and services for their learning. Innovative learning media focuses on the learning process of students who are designed, developed and managed creatively, dynamically, by applying a multi-direction approach to better, and using the latest media to create an atmosphere and learning process that is conducive for students (Mushfi *et al.*, 2021).

Technological innovation, in this frame, is bound to give new strength to the collaborative learning theories stemming from constructivism and to the concept of knowledge self-creation, shifting the focus from a teacher-centered to a student-centered learning. As a matter of fact, new technologies enable students to build up an interactive network of knowledge in which a key-role is played by the learning environment and by students' capacity to give their contribution to the creation of knowledge, playing the role of "prosumers", while teachers' role is converted to that of a "tutor" or "facilitator". Constructivism is based on the idea that teacher's knowledge cannot be simply transferred and stored, but implies an active role from the learner who creates his/her cognitive representations starting from his/her interactions with the surrounding environment, consisting of people, contents and learning materials. This cognitive paradigm is essentially based on a new concept of teaching and learning, laying the foundation for a new role of teachers and students, resulting from the interaction and from the capacity to build knowledge throughout the environment in which this process takes place. According to constructivism, learning cannot be simply reduced to the acquisition of knowledge, as in traditional teacher-centered settings, but must be regarded as a process in which the trainee build up his/her cognitive representation on the base of his/her relation with the learning community and the external environment (Doré and Basque, 1998).

Moving from the assumption that cognitive and learning processes are the result of the interactions with the environment, theorists have developed the concept of **collaborative learning**, investigating how new technologies can enable students to better contextualize and place cognitively the learning tasks, benefitting from active interactions with the learning community and with the teachers/facilitators. The concept of collaborative learning, as evidenced by the literature, makes

reference to a specific situation in which students, at different stages, cooperate for achieving a common goal. In digital-based contexts, cooperating means sharing tasks, values and goals with the aim to create something new throughout the cooperative process. To this aim, people are expected to acquire knowledge, skills and behaviors which result from the ongoing group-based learning process (Kaye 1994). Until the digital era, such a process corresponded to a physical space where the interaction was ensured by the direct contact with the community of learners, based on 4 pillars:

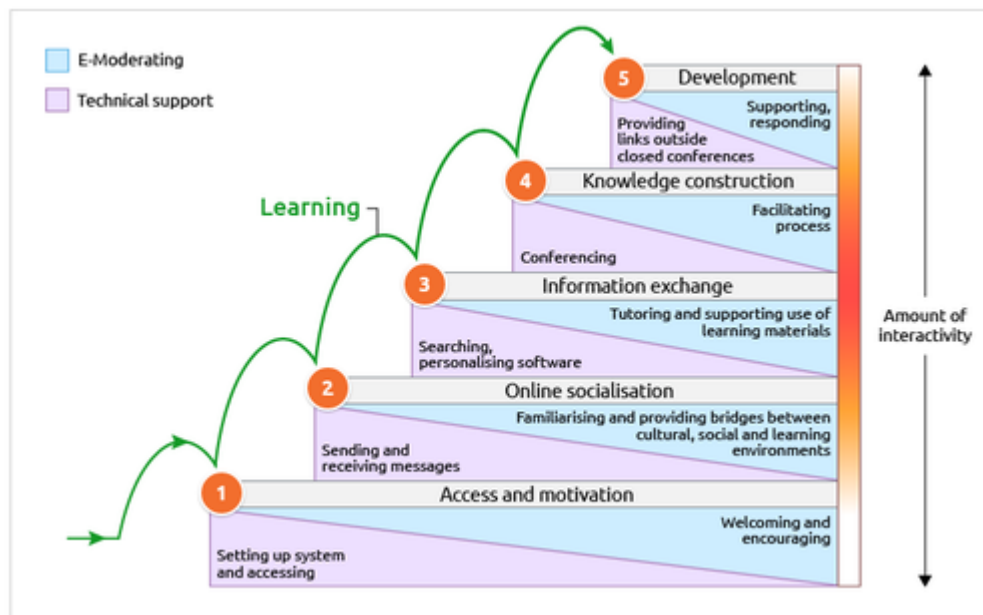
- Context, a setting that should reproduce the real situations in which expected tasks must be implemented, ensuring a certain degree of learning fluidity to avoid stiffness (Brown *et al.*, 1989).
- Construction, the process through which the knowledge is generated starting from the elaboration and interpretation of individual cognitive experiences (Jonassen, 1991).
- Cooperation, the central pillar of collaborative learning which cannot prescind from open spaces which can facilitate the sharing and review of opinions, paving the way for the onset of new ones
- Conversation, which is essential for elaborating the new acquired meanings through the language.

Digital environments have made possible the adoption of new learning approaches based on group-works, documentary research, request for information, sharing of experiences, cultural confrontation, co-creation and cooperation for achieving common goals. Research studies carried on by theorists on “electronic communities” (Rheingold, 2000) have demonstrated that technologies enable the natural social aptitudes of individuals, offering a proper environment for sharing interactions and communication and enhancing the creation and production of social knowledge, as in the case of users who turn into prosumers. According to Henri (Henri, 1995), one of the most common justification for adopting telematics in the educational and professional field is the conviction that computer networks increase collaborative learning, social osmosis as well as the circulation of ideas, fostering the acquisition of new knowledge. Substantially, computer networks would create virtual classrooms and laboratories (Harasim, 1993; Silva and Cartwright, 1993) where the learning process would be facilitated and promoted, benefitting from the added value of digital contextualization. The use of the PC, for example, would ease some tasks throughout the interaction which would contribute to social confrontation and therefore to the resolution of cognitive and relational conflicts. A digital contextualized learning would bestow meaning to the acquired knowledge which would be then elaborated at a deeper cognitive level, providing a higher degree of comprehension. Contextualization, social interaction and cooperation, on students’ side, would be strategies resulting in a better capacity to integrate new knowledge and apply it to specific contexts. Similar findings stand out in the studies of Nastasi and Clements about the effect of social processes on cognitive activities which would benefit from the use of computer networks which would help cognitive growth through social interconnections leading to more effective problem solving strategies. Cognition and interaction would be always interlinked, as in computer networks.

#### **4.2 The Five Stage Model as a methodology for designing collaborative learning in an online/blended setting**

For digital learning to be successful, participants need to be supported through a structured development process. The **Five Stage Model** provides a framework or scaffold for a structured programme of e-tivities, offering essential support and development to participants at each stage as they build up expertise in digital learning.

## The Five Stage Model



Source: [Gilly Salmon](#)

**Stage 1 (Access and motivation):** at stage 1 learners are still transitioning into the digital-based learning environment. They are able to access learning everywhere, integrating into their everyday life digital devices which are mobile, transportable and inter-connected across time, location, culture and experience. At this stage, learners know that technical assistance is available, if needed. E-moderators are ready to welcome them as they begin their learning journey.

**Stage 2 (Online socialization):** at stage 2 learners start to advance into their network, benefitting from connectedness. This comes along with the fact they bring their own language, anxieties, hopes and experiences. In this frame, the e-Moderator acts as a host through the framework and web of e-tivities. Participants experience online socialization and create the basis of their own micro-community.

**Stage 3 (Information exchange):** at stage 3 learners get stuck into information exchange and achieve cooperative tasks, interacting with the Moderator and with the sparks to start the dialogue around the e-tivities. In this phase, they increasingly benefit from the relations with their learning peers, starting to learn how to manage their time.

**Stage 4 (Knowledge construction):** at stage 4 learners are increasingly able to take control of their own learning, becoming an effective part of the knowledge community. Within the group, they start to be appreciated for their role. The e-Moderator provides guides for the activities along with the foreman of the group, helping the participants to head towards the achievement of their goals.

**Stage 5** (Development): at stage 5 participants become more confident both as online learners and members of the group. They are able to build on the ideas acquired during the e-tivities and to integrate them into their own context and workplace. They enjoy looking back and learning afresh from the whole experience, preparing to set out on new journeys. They deploy their new knowledge to demonstrate achievements in assessment.

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## 5. Assessment

### 5.1 Applying the Constructive alignment theory

As with face-to-face teaching, online and blended classes need to be 'constructively aligned' (a term developed by Professor John B. Biggs) to achieve maximum learning benefits and outcomes. Constructive alignment means that all aspects of the class - from learning outcomes, lectures, resources, activities and assessable projects - are all directly related to each other, and support a progressive (or scaffolded) system of learning throughout the duration of your course. Assessment is typically a series of progressive activities that act as stepping-stones that allow students to gradually build, apply and evaluate knowledge, with each task directly relating to particular learning outcomes (Karin Watson, Learning to teach online).

This approach to teaching is learner-centered in that the target is what the learner has to achieve and how the learner may best be engaged in order to achieve it to the required standard. The teaching design is outcomes-based and assessment is necessarily criterion-referenced. The term "constructive" is used because the model is based on the psychology of constructivism of which there are several kinds (Steffe & Gale, 1995), but what they have in common is the idea, referred to by both Tyler and Shuell, that knowledge is constructed through the activities of the learner. The key to good teaching then is to get the learner to engage those activities that are most appropriate to the ILO in question. The term "alignment" is used because both teaching and assessment need to be aligned to the intended learning outcomes. Teaching in institutions, however, has traditionally been conceived in precisely the opposite manner on all counts: teaching is teacher-centered, the focus being on what content the teacher has to "cover", teaching is largely held constant with lecturing the default method, and assessment is norm-referenced. Until very recently most universities adhered to this teacher-centered design (Biggs, 1993, 1996).

To apply the Constructive alignment theory teachers should use precise strategies:

- Teachers should consider the scope of the lessons and determine what they want their students to know by writing precise outcomes.
- Teachers should focus on these outcomes identifying specific information, knowledge or skills that students should acquire.
- Establish how students will be able to demonstrate their learning. This will help make learning outcomes specific in terms of their assessment, and will also assist in determining learning activities and designing course assessment (Karin Watson, Learning to teach online).
- Design the assignment and activities that would facilitate these outcomes.
- Consider the range of learning activities and teaching approaches that engage students in reading, thinking and discussing the content, and which support students in successfully completing tasks and ultimately achieving learning outcomes. This may include readings, lectures, activities, discussion topics, etc. This can then serve as a prompt for establishing which activities could be best served by an online component, and integrated into the curriculum (Karin Watson, Learning to teach online).

Although the general idea of CA has been around for some time, it is only recently that it has been implemented on a reasonably large scale. Part of the reason for this is that the massive expansion in tertiary education involves a diverse range of students and of teaching subjects so that teaching and assessment need to be reviewed on an institution-wide basis with emphasis upon outcomes at institutional, programme and unit levels. CA provides a framework for adjusting teaching and assessment to address the attainment of those outcomes and the standards reached. Research indicates that CA is effective in this but it initially requires time and effort in designing teaching and assessment and, as a systems approach, it is important that supporting institutional policies and procedures are in place. CA properly implemented enhances teaching and learning quality and thus, as a form of quality enhancement, subsumes forms of quality assurance that can often be counter-productive.

The essential ideas underlying constructive alignment were proposed by Ralph Tyler (Tyler, 1949) in his best-selling “Basic principles of curriculum and instruction”. Tyler set four questions:

- What educational purposes should the school seek to attain?
- What educational experiences can be provided that are likely to attain these purposes?
- How can these educational experiences be effectively organized?
- How can we determine whether these purposes are being attained?

The most useful way of stating curriculum objectives, he said, is to express them in terms that identify both the kind of behavior to be developed and the context or area of life in which this behavior is to operate.

Tyler’s book went to 36 editions and was a basic text in almost every teaching education institution in the United States. He appeared on numerous advisory committees in relation to school education, and was regarded as the father of teaching objectives and undoubtedly influenced his University of Chicago colleague, Benjamin Bloom, in Bloom’s notion of mastery learning (Bloom, Hastings & Madaus, 1971). In retrospect, however, he appears to have had little enduring influence at school level, and virtually none at all in higher education, apart perhaps from the Keller Plan, which is a form of mastery learning (Keller, 1968).

Thomas Shuell later restated Tyler as follows: “If students are to learn desired outcomes in a reasonably effective manner, then the teacher’s fundamental task is to get students to engage in learning activities that are likely to result in their achieving those outcomes. It is helpful to remember that what the student does is actually more important in determining what is learned than what the teacher does” (Shuell, 1986, p. 429).

This seemingly motherhood statement is exactly that: it reminds us that in institutional learning and teaching we should go back to the teaching model that is indeed used by mothers with children. That is, teachers should focus on what outcomes students are meant to achieve and help them to do so, which almost always means something other than talking for an hour while the learner takes notes.

## 5.2 The operational framework for constructive alignment and its impact on assessment

The operational framework for this teaching design at the unit level is in its basics:

- Describe the intended learning outcomes (ILOs) for the unit, using one verb (or at most two) for each outcome. The ILO denotes how the content or topics are to be dealt with and in what context.
- Create a learning environment using teaching/learning activities (TLAs) that require students to engage each verb. In this way the activity nominated in the ILO is activated.
- Use **assessment** tasks (ATs) that also contain that verb, thus enabling one with help of pre-determined using rubrics to judge how well students' performances meet the criteria.
- Transform these judgments into final grades and assessment procedures.

The summative assessment determines how well students can achieve those outcomes in appropriate contexts. Thus, assessment is about judging the whole performance against predetermined and public rubrics, not by awarding marks analytically for aspects of the tasks and then summing them. Analytic assessment is useful formatively, for alerting the student to weak aspects of their performance, but the final summative assessment is logically on how well the performance itself can be carried out.

McMahon and Thakore (2006), in a comprehensive review of higher order thinking and critical thinking in constructively aligned courses at University College Dublin, found that CA led to:

- Greater standardization leading to fairer and more reliable assessment. When assessment criteria follow from stated outcomes, decisions on how many marks are awarded are much easier to compare and defend.
- Greater transparency leading to: (a) easier and more accurate inter-university and international comparisons, (b) students being able to focus more effectively on the key learning goals.
- More effective evaluation of both modules and courses: given the outcomes, an evaluator can estimate how well teaching and learning strategies, content, materials, other resources and assessment procedures actually support students in achieving them.
- Greater coherence in programmes of learning.
- An increase in the criticality and depth of student work.

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## 6. Recognition

### 6.1 Micro-credentials, digital badges and e-portfolio: toward competence-based recognition

Micro-credentials represent a key-instrument for supporting and fostering the up-skilling and reskilling of the labor force. As a framework, they have been introduced on June 16th 2022 by the Council of the European Union through the adoption of a Recommendation on a European approach to micro-credentials for lifelong learning and employability. Since lifelong learning is widely regarded as an essential trait for ensuring that every EU citizen can rely upon a set of skills and competences which are required to cope with the challenges of the twin transition in the frame of the Agenda for competences, micro-credentials can be considered as the way in which such competences can be officially certified and recognized.

Differently from traditional certification, which are usually targeted at young people at the beginning of their professional career and focused on the recognition of a wide set of competences and skills, micro-credentials are:

- aimed towards all professionals, regardless of their age and mainly identifiable with people already included in the job market;
- focused on the acknowledgment of specific, targeted and “small” competences, as the technical ones, which can be developed through short-term learning paths which can be acquired rapidly for being immediately transferred into the professional activities.

These credentials can be made available by a wide variety of public and private providers in response to the growing demand for more flexible learner-centered forms of education and training, which are more and more requested for facing the challenges rising from digital and green transition. They also have, in the meantime, the potential to offer education and training opportunities to a wide range of learners, including disadvantaged and vulnerable groups.

To this aim, the Recommendation provides building blocks including a definition, standard elements for describing micro-credentials and principles for designing and issuing them. In such a way, it sets proper conditions for the adoption of micro-credentials at EU level, involving stakeholders and providers of both public and private sector, from education and training institutions to private companies.

The entanglement of private companies and enterprises represents a strength of micro-credentials’ system, creating the conditions for a more targeted focus of learning outcomes on the effective needs of the job market in terms of new skills and competences and overcoming the traditional gap existing, especially in some EU countries, between training programs and effective demand of new competences (the so-called skill gap). From this point of view, micro-credentials turn out to be a powerful instrument for promoting employment and employability of the workforce, to whom they ensure the holding of those skills and competences which are required to find out a proper and rewarding placement on the job market.

While the term ‘micro-credentials’ is increasingly used to capture the official and/or formal valuing of short units of learning, a number of other terms are commonly used. These include, but are not limited to:

- professional certificates or cards;
- vendor-specific and vendor-neutral certificates;
- digital badges/open badges;
- academic certificates;
- nano-degrees;
- micro masters.

Such short courses and certificates span a vast range in terms of who offers them (e.g. whether public or private providers), their content (whether they specify learning outcomes) and the standards that pertain to them (the robustness and transparency of quality assurance methods). It is likely that most small credentials, currently caught up in discussions of ‘micro-credentials’, do not conform to some normative standards implied in the European Commission working definition, which links ‘micro-credentials’ to standards (such as the specification of qualification levels, credits gained, the possibility to combine them into larger credentials or qualifications, and the underpinning of transparent and agreed quality standards).

## 6.2 Key purposes of micro-credentials in formal education, training and learning

As a matter of fact, micro-credentials represent a targeted, sustainable and tailored approach to the certification of competences, responding to the need of a deep transformation of education, training and learning approaches. As well known, the challenges set by the digital and green transition imply to a greater extent the need to conceive training courses which are short, focused on specific needs and easy to be embedded in the professional routine, especially in contexts dominated by the rising of merely technical skills which must be rapidly transferred and oriented towards the operability. Traditional training paths, usually based on frontal lectures and long-term courses, do not lend themselves to intercept such kinds of needs which are typical of rapidly transforming contexts in which the technical dimension is often described as “decisive”.

In such a framework, therefore, micro-credentials come along with micro training, sometimes described as “Lego model” because the know-how can be broken down into several small bricks, to which is related a micro-certification (or credential/badge...).

Within the labor market, short learning activities are usually provided to meet a variety of needs which can include:

- specific professional development needs, which often come from well- established professional organizations;
- ad hoc needs to close skills gaps and update skills, which constitute a large private market that is often not assessed and is based on certificates of attendance;

- internal company training and career development, which is usually organized by individual companies, both in-house and by private providers, with large companies often providing their own training offers.

A recent survey, conducted by ETF (European Training Foundation)<sup>2</sup>, has identified the following ones as the main benefits resulting from the adoption of micro-credentials:

- Micro-credentials have immediate relevance to labor market demand: they are linked to specific skills/competences; address a specific work need; responsive to changes in the labor market; enable quick access to work; bridge the gap between formal education qualifications and specific industry or workplace requirements.
- Micro-credentials support individual learning: they are focused on specific learner needs; learners can progress at their own pace; they are an easy way of accumulating learning in small pieces; they are stackable towards a qualification and facilitate access to formal education.
- Micro-credentials have stand-alone value: a micro-credential is a meaningful part of a qualification or a complementary/supplementary award which can have a meaning in the labor market, adding value to a formal education qualification.
- Micro-credentials facilitate the recognition of individual skills, knowledge and competences acquired outside the formal education, improve the visibility of lifelong learning and allow the certification of advanced skills in a given area.
- Micro-credentials ease the design of flexible training and are cost and time saving (short duration of learning allows to ensure affordable prices).

A proper understanding of the micro-credentials phenomenon cannot however prescind from a glance at the main drivers of change underpinning the recourse to this innovative system:

- The fourth industrial revolution, which has brought with it structural economic and labor market changes and has been characterized by the digitalization of products and services, automation, artificial intelligence, robotics, the internet of things, autonomous vehicles, 3D printing, nanotechnology, biotechnology, materials science, energy storage and quantum computing. It has opened up new industrial sectors and professional disciplines and has broken some professions into more specific subspecialties, creating a greater need for continuous re-skilling and up-skilling and a more focused training.
- Changes in the nature of teaching and learning that have been decoupled from time and space, creating a significant increase in the ability to provide learners with new and different experiences, as well as faster and more tailored feedback. At the same time, labor market demands for digital and individualized learning have risen steadily, in line with the discourse surrounding 'just in time', on-demand training and learning. The Covid-19 pandemic, on the other side, has further increased the demand for and the digital capacity to develop such learning activities. As a matter of fact, some of the most important digital credentials and MOOC (massive online open course) platforms have been developed in parallel with the recent advancement in information and communication technology (ICT).

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<sup>2</sup> AA.VV., Micro-credentials for labor market education and training su [www.cedefop.europa.eu](http://www.cedefop.europa.eu) , 2022.

- The globalization of competences and labor markets, under which international vendor certificates are becoming industry standards and the sought-after certificates have become those that define industry standards for competences. An example of this exists within the ICT sector itself, which has an ‘internal’ market in technology certificates (e.g. from Cisco, to provide business-to-business products and services), as well as an ‘external’ technology market, providing certificates to the consumers of products (e.g. Microsoft).

### 6.3 What are the links between modularization and micro-credentials?

More and more frequently, vocational education programs which are designed for a specific qualification are becoming modularized; i.e. they are expressed in terms of learning outcomes, grouped into smaller units. Modularization is also seen as a way of providing individual learners with greater flexibility to pursue more personalized and flexible learning pathways. The main purposes and objectives of micro-credentials seem to echo this goal of modularized learning, which partly explains why, in many countries, certificates relating to parts of qualifications or modules are often associated with micro-credentials. For example, in Denmark, in CVET courses focusing on the labor market, modules are well developed and recognized and could potentially form the basis for initiatives using micro-credentials. In Spain, VET is modular and, according to the new law, although micro-credentials initially lead to a non-formal vocational certificate, they can be accumulated and lead to a VET diploma; thus they are understood as an element of formal VET studies. In Latvia, according to the amendments to the VET Law, every completed module leads to a certificate that can be used either independently or for building-up a qualification. This is considered as a policy measure that introduces micro-qualifications and related principles in vocational education (both secondary and higher) even without mentioning the term micro-qualification. In Czechia, the effort to modularise initial VET programmes could be considered the closest to the concept of micro-credentials.

However, there is no uniform approach to the relationship between micro-credentials and modules; experts participating in the CEDEFOP<sup>3</sup> studies explained that micro-credentials should not only be identified as deconstructed qualifications, but should also refer to something supplementary to the existing system. According to some of them, learning activities leading to micro-credentials should be independently designed and standalone.

### 6.4 Which elements should be included in micro-credentials?

Key information elements are crucial to ensuring that end users, including learners and employers as well as education and training institutions, understand what micro-credentials entail. Such elements, as a matter of fact, are bound to foster trust, transparency and transferability of micro-credentials, increasing their exchange value. Micro-credentials must be transparent and understandable and should include summary of critical information such as:

- the title;

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<sup>3</sup> AA.VV., Micro-credentials for labor market education and training su [www.cedefop.europa.eu](http://www.cedefop.europa.eu) , 2022. 43.

- the duration of the learning activity to which they are referred;
- provider of the course;
- description of the content;
- learning resources;
- type of assessment;
- credits attributed to the course;
- prerequisites needed for enrolment;
- learning outcomes;
- body ensuring the quality of the course;
- options for stackability, if any.

The information elements included in micro-credentials issued by VET providers within and outside formal education and training systems vary. However, the most common information elements are identical, regardless of whether the micro-credential is issued by a VET provider, an employer or an employee organization. Micro-credentials usually display the title and date of issue, the identity of the holder and provider, as well as the learning outcomes achieved.

### **6.5 Mode of delivery and type of certification**

The mode of delivery of micro-credentials can also vary from classroom-based to online or blended. The online delivery option provides greater flexibility regarding the pace and time dedicated to the learning activity, while the blended and classroom-based delivery modes are more cost-intensive and require the learner to be present in a classroom.

Technological advancements coupled with the recent COVID-19 pandemic have substantially boosted the uptake of online learning across Europe. There is a tendency to expect that the demand for short online courses might grow further in the future, although the traditional classroom-based mode of delivery is still commonly used. Even though the literature review suggests the importance of digitalization for micro-credentials, this is not fully supported by the study findings. For example, among VET providers offering micro-credentials, the most common mode of delivery is classroom-based learning. Among employee and employer organizations, blended and online learning are more widespread.

Similar findings emerge with regards to the type certification formats used for micro-credentials which are usually issued in a paper format.

### **6.6 Barriers to using micro-credentials for labor market-related education, training and learning**

Taking into account the barriers which are currently hindering the diffusion of micro-credentials system at EU level, the lack of knowledge arises as the prominent one: when asked about various aspects relating to micro-credentials, many respondents to a recent CEDEFOP survey<sup>4</sup> report to be not able to provide specific answers. For instance, 41% of national authority representatives did not know whether any barriers existed to the uptake of micro-credentials, while 31% replied 'yes' and 28% 'no'.

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<sup>4</sup> AA.VV., Micro-credentials for labor market education and training on [www.cedefop.europa.eu](http://www.cedefop.europa.eu), 2022.

As a matter of fact, the proliferation of micro-credentials has led to a certain degree of chaos among stakeholders. The CEDEFOP analysis showed that, across various national contexts and stakeholder groups, there is confusion regarding what the term actually means.

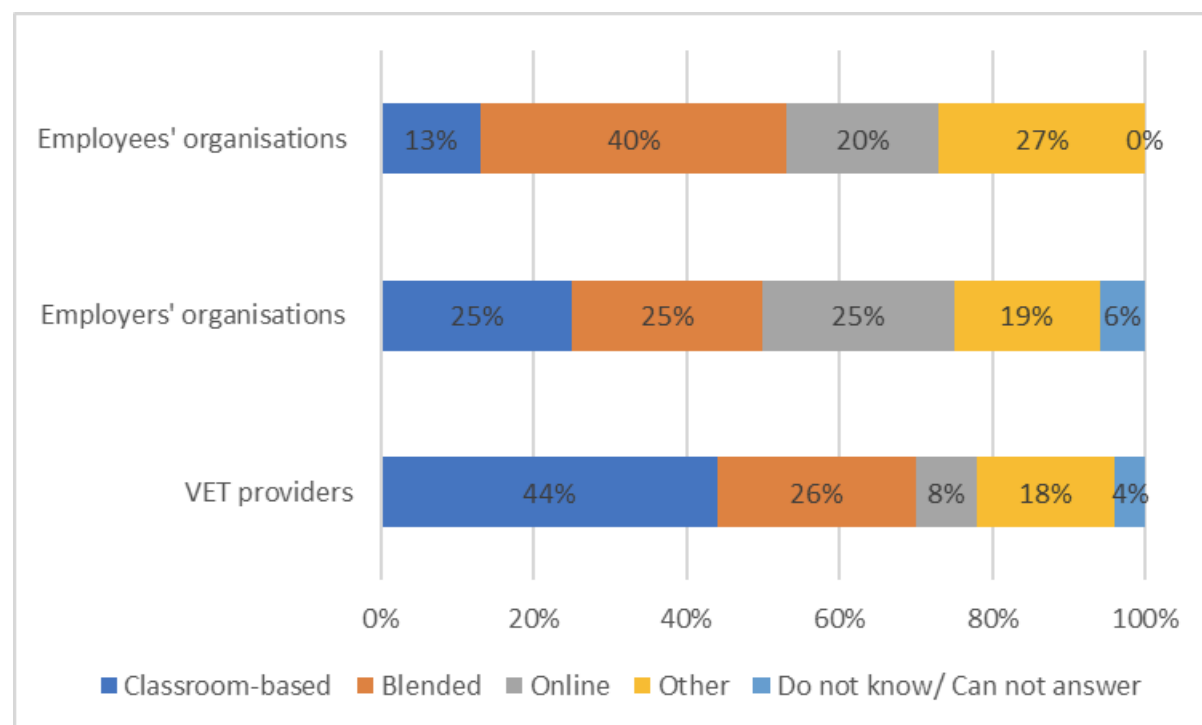


Figure 7 Modes of delivery of micro-credentials by group of providers (Cedefop)

Among national authorities, 55% confirmed that the term is not used in their context, while 48% of VET providers could not indicate whether their organizations provided micro-credentials or not. This lack of a transparent and commonly agreed definition was identified as a key barrier, along with the fact that recognition is not standardized. These findings suggest that micro-credentials are still an emerging phenomenon, far from having reached its peak. Add to this, VET providers highlighted structural issues for not offering micro-credentials, as:

- the attitude to provide only full qualifications, resulting from traditional, long-term training paths;
- the lack of understanding and recognition of the competences acquired through the micro-credentials, especially from employers;
- the lack of agencies/public bodies certifying the value of micro-credentials;
- the lack of funding programs for promoting and supporting the spread of micro-credentials;
- the lack of recognition of micro-credentials from many training providers;
- their absence in the national policy agendas;
- the lack of interest from learners, mainly due to the scant appreciation for short-term learning activities;
- the lack of compatibility of micro-credentials with the national qualifications framework.

Generally speaking, there seems to be a wide consensus that micro-credentials are commonly used to supplement traditional qualifications, or to form part of these qualifications when operating in some

modularized systems. As mentioned above, full qualifications most often target youths and young adults, either before they begin or at the beginning of their careers; micro-credentials, on the other side, more often target people who already have full qualifications or experience of working life. As a consequence, micro-credentials are often regarded as a complementary learning that adults engage with after having obtained a full qualification and entered the labor market.

What future can be then envisaged for micro-credentials? Traditional education and training will probably be here to stay, but education and training systems cannot remain stagnant and must evolve with the changing needs of society and the labor market; micro-credentials could give a contribution in this regard!



## Blueprint

### 1. The context

The impact of digital technologies, contents and processes can be seen in all educational sectors (e.g., schools, higher education and also informal and non-formal learning), affecting all aspects of the educational value chain (e.g., curricular reform, teaching and learning practices, assessment, continuous professional development) and encompassing all educational actors (teachers, learners, school leaders), their roles and competences.

As a matter of fact, digital technologies are enablers of a step change in learning and teaching practices; however, they do not guarantee it. Change that is both sustainable and at scale requires a multi-faceted systemic approach, including investment in infrastructure and in teacher professional development, curriculum change, rethinking students' assessment and role and teachers' appraisal, making the right decisions about curriculum-related content, promoting collaboration and open content and practices, and integrating all these within an environment that ensures good governance and oversight of quality.

The **Europe 2020 strategy** acknowledges that Education and Training (E&T) have a strategic role to play for Europe to remain competitive, overcome the current economic crisis and grasp new opportunities. Digital transformation of E&T systems is present in several Europe 2020 flagship initiatives, and boosting digital skills and online learning is among the priorities of the EU Commission. Also, the European Commission's Opening up Education initiative emphasizes the need for educational institutions to review their strategies in order to integrate digital technologies in their teaching, learning and organizational practices, intervening on **pedagogical, social, managerial and technical dimensions**.

However, the digital transformation of educational organizations is progressing at uneven pace, with different aims and outcomes in different regions and countries in Europe. As a result, there is little scope for mutual learning about best practices or about any failures in the process of integration or effective uses of digital learning technologies. Hence, there is a risk that cooperation opportunities are lost, work is duplicated and mistakes or sub-optimal implementations are repeated.

#### **1.1 The DigiTransformEdu project: aims, target groups and expected achievements**

In this frame, the **DigiTransformEdu project** aims at making the point about these challenges by suggesting a comprehensive analysis of the scenario as well as of the new teachers and students' roles, while providing a selection of best practices and recommendations to which it may be useful to make recourse in order to promote a sustainable shift toward a digital-based training and learning experience.

The DigiTransformEdu project aims to foster the digital transformation of HE and tertiary VET institutions by encouraging the digitalization of educational processes and promoting effective digital-age learning among other objectives. Its primary target group consists of:

- institutional leaders responsible for the digital agenda;
- program managers responsible for the digitalization of pedagogy;
- digital educators who belong to A2 and B1 levels of DigCompEdu.

The secondary target group is represented by:

- HEIs;
- tertiary VET providers;
- associations of educational and training institutions;
- businesses and their learning departments;
- professional associations, students, participants and learners in general.

As beneficiaries, they will profit from the enhanced digitalization at institutional and pedagogical level leveraging the improved digital competence of their educators. Thanks to the project, institutional leaders of both HE and tertiary VET institutions will have better capability and vision on how to lead their organizations through digital transformation, program managers will be equipped with guidelines and operational tools to be able to make the transition from a traditional class-based pedagogy to a blended or pure digital one, while educators will see their digital competence improved.

The expected achievements of the DigiTransformEdu project can be summed up as follows:

- increased knowledge about the the current state of affairs in the transition of higher education and training to digital education;
- better comprehension on how to strategically deal with the digital transformation;
- increased familiarity with approaches and pedagogical operational tools on how to design, deliver, assess and recognize digital education;
- better understanding of the new roles of digital educators as well as of the knowledge and skills needed for their fulfillment;
- increased capacity to design training starting from profile descriptions;
- increased digital competence of educators.

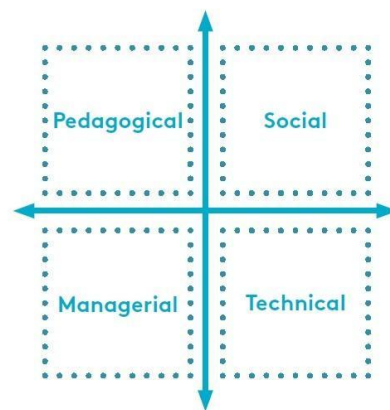
In the coming pages you will find a list of practical **recommendations** for introducing the digital approach in traditional learning contexts. In detail, you will have access to:

- the new teaching and learning framework in a digital/blended setting;
- a list of synthetic and immediately applicable recommendations for introducing digital technologies in educational organizations, based on three cross-sector thematic fields among the ones identified by [DigCompEdu](#) in-depth analysis: **contents & curricula creation, teaching and learning practices and assessment practices**;
- a selection of innovative pedagogical models for designing and managing digital training sessions;
- an in-depth analysis of OERs providers and repositories, as well as a focus on intellectual property rights issues and licenses types;
- an overview of the selected **best practices** from which to draw useful insights and suggestions.

## 2. THE NEW TEACHING AND LEARNING FRAMEWORK IN A DIGITAL/BLENDED SETTING

The Covid-19 pandemic has forced education into a whirlwind computerization process, which has disclosed some critical issues as well as new opportunities. What we have understood, during and after this period, is that teachers should play different roles for what concerns pedagogies and the acquisition of new digital ways of teaching. Since there is the necessity for teachers to oversee more and different dimensions within the teaching and learning process mediated by digital technologies, it is important to understand which are those dimensions and what each of them entails.

### The new dimensions of teaching and learning processes mediated by digital technologies



According to Ilgaz and Gulbahar (2015), four are the dimensions we should take into consideration:

- The **pedagogical dimension**: it refers to pedagogical and assessing expertise. Teachers in the digital world need to be experts in theoretical and practical pedagogical knowledge, which will allow them to make decisions and act effectively on issues related to student teaching and learning (how to design courses according to the learning goals providing effective instructional design strategies, which pedagogies to use according to the specific learning settings and goals, which digital tools to use which are suited to the concerned pedagogy and learning goal, how to organize and scaffold the course schedule and the most appropriate strategies for evaluating learning processes and results, ecc.). This dimension encompasses the ability of teachers to use digital tools and resources to enrich classical pedagogical models, to be able to identify and select teaching strategies that capitalize on the students' digital potential and abilities to enhance the classroom and learning experience, to align assessment methods with learning goals, pedagogies and tools.

- The **social dimension**: it refers to interpersonal and communication skills with the goal to make students feel closer despite the physical distance (perceived proximity). Teachers should encourage learners to participate actively and to communicate on synchronous and asynchronous mode fostering interactivity, peer and collaborative learning as well as co-creation, while progressively encouraging the shift from a teacher-centered to a students-centered approach.
- The **managerial dimension**: it refers to administrative and organization skills. The vast number of online lessons, videos, simulations, and activities, combined with the pressure to get started, have left many teachers feeling overwhelmed. It is therefore important for teachers to develop the capacity to plan, orchestrate, align and manage the new learning programs made of a vast array of digital and physical spaces and tools and to ease the access for students offering clear guidelines, scaffolding and instructions on what to do and how to participate. All this without leaving behind a renewed focus on privacy rights and special needs.
- The **technical dimension**: it refers to technological literacy. As said, the new digital learning environment is composed of an array of different environments and tools, (i.e. Moodle, Google Classroom, MOOC, etc.), where the course, teaching materials (OERs, teachers' videos and material) and students' interactions are hosted, and web tools (i.e. Mentimeter, Kahoot, padlet, etc.) teachers might decide to use during the course to activate students and to foster peer-learning and the process of collaboration/co-creation. Teachers unfamiliar with such technologies and with the management of learning analytics should be allowed time to learn how to use them and to review contents to avoid problems when they go live. Likewise, students should be supported in properly using the concerned technologies.

## 3. CASE STUDIES OVERVIEW AND KEY ELEMENTS FOR THE DIGITALISATION OF PEDAGOGY

You will find here below an overview of the investigated case studies, including a brief profile of the selected institutions as well as the name and job title of the contact persons who have been interviewed by the project partners on the basis of a check list which has been focused on the following pedagogical areas:

- curricula design;
- delivery: teaching;
- delivery: learning;
- assessment;
- recognition.

A specific description of the key elements which should be taken into account for the digitalization of pedagogy in the five areas has been provided in table after the case studies overview.

You will find the complete collection of pedagogical case studies at the following [link](#).

### 3.1 Case studies overview

#### 1) Politecnico di Milano (Milan, Italy)

Politecnico di Milano is a public scientific-technological university which trains engineers, architects and industrial designers.

The University has always focused on the quality and innovation of its teaching and research, developing a fruitful relationship with business companies and the productive world by means of experimental research and technological transfer.

Research has always been linked to pedagogies and it is a priority commitment which has allowed Politecnico di Milano to achieve high quality results at an international level and to join the university to the business world. Research constitutes a parallel path to that formed by cooperation and alliances with the industrial system

Contact person: Massimo Tadi (Department of Architecture, Built Environment and Construction Engineering)

#### 2) Algebra University College (Zagreb, Croatia)

Algebra University College is the flagship of the largest private educational organizations in the

Republic of Croatia and the region (Algebra group). Today it is present in more than 20 cities across Croatia. Founded in 1998, it currently counts on more than 150 full-time employees and more than 600 associated experts and higher educational trainers employed also in industry.

Annually, Algebra educates around 15.000 students through various seminars and short educational programs in adult education, additional 3.000 kids and young in Digital

Academy and State Matura exam prep. programmes, while in higher education it enrolls more than 400 new students each year.

Contact person: Ana Tecilazić (PhD, Secretary General)

### **3) ESI CEE (Sofia, Bulgaria)**

Foundation European Software Institute Center Eastern Europe (ESI CEE) is a not-for-profit organization focused on applied research and services in the benefit of the ICT industry, cooperating with leading enterprises and SMEs from ICT, financial and processing industries.

It supports ICT-intensive organizations to gain and sustain competitive advantages through agility, process management and cybersecurity.

It applies research, awareness, training, coaching and appraisals in the field of cyber resilience (RMM, OWASP, etc.), agile development (Lean Kanban and Scrum), and process management (CMMI, Balanced Scorecards, MBO, etc.).

Contact person: Ivaylo Gueorguiev (AGILE coach and trainer)

### **4) FH Münster University of Applied Sciences**

FH Muenster University was founded on August 1, 1971 from the merger of state and private construction and engineering schools as well as institutions offering vocational technical training. At that time, the number of students was around 2,300 - today there are more than 15,000 young people studying in over 100 bachelor's and master's degree programs. Accompanied by an in-house doctoral college, around 110 cooperative doctoral students are also currently gaining qualifications.

Over the years, FH Münster has developed into a practice-oriented, international and interdisciplinary university. Lecturers and students contribute to the successful transfer of scientific findings into practice. The university is one of the most successful universities of applied sciences in Germany.

Contact person: Dominik Lappenküper/Act. Prof. Sue Rossano-Rivero (Economy Department)



### 3.2 Key elements for the digitalization of pedagogy

Pedagogical areas	Descriptors from the investigated case studies
<p>Curricula design</p> 	<ul style="list-style-type: none"> <li>● Clear and structured instructional design approach to actively engage the participants.</li> <li>● Flexibility and focus on personalization.</li> <li>● Communication of digital learning's benefits as a standard approach both within and outside the educational organization.</li> <li>● Active learning and simulation.</li> <li>● Focus on practice and employability.</li> <li>● Students-centered approach supported by scaffolding activities.</li> <li>● Virtually, hybrid or face-to-face delivery.</li> <li>● Availability of different learning methods and learning management systems.</li> <li>● Provision of open platforms for contents' sharing and repository.</li> <li>● Digitally equipped and updated.</li> </ul>
<p>Delivery: teaching</p> 	<ul style="list-style-type: none"> <li>● Focus on training trainers on the four dimensions of digital learning: pedagogical, social, managerial and technical.</li> <li>● Provision of guidelines, procedures and training to teachers to get prepared for delivering digital learning according to specific standards.</li> <li>● Preliminary scaffolding training courses to make students familiar with rules, methodologies and supervisors' roles.</li> <li>● Focus on students' empowerment at contents', technical and social level.</li> <li>● Mentoring services and workshops, especially for distance learning.</li> <li>● Active involvement of the faculty members to fine-tune the design of training curricula.</li> <li>● Organization of workshops to establish courses, exchange best experiences and testing methods and examples of good practices and innovation in teaching.</li> <li>● Creation of institutional and external repositories - open to co-creation - for making available reliable teaching materials.</li> <li>● Focus on transferable skills such as problem-solving, critical thinking and reflective thinking.</li> </ul>



<p>Delivery: learning</p> 	<ul style="list-style-type: none"> <li>● Support for students' proactivity and consciousness in the learning journey.</li> <li>● Close students' supervision.</li> <li>● Possibility to determine time and pace of the learning journey.</li> <li>● Personalization of support with a peer-based approach.</li> <li>● Focus on students' needs and engagement.</li> <li>● Tailoring of learning opportunities to the capabilities of diverse learners.</li> <li>● Focus on students' co-creation in the learning experience.</li> <li>● Development of students' responsibility, accountability and autonomy.</li> <li>● Focus on students' centrality and co-creation in the learning process.</li> <li>● Attention to the sphere of cultural differences.</li> </ul>
<p>Assessment</p> 	<ul style="list-style-type: none"> <li>● Definition of a sound assessment strategy, including both formative and summative assessments.</li> <li>● Provision of a multi-level assessment (focused both on the experience and the objectives).</li> <li>● Conduction of assessment through digital surveys accessible by web and mobile.</li> <li>● Respect for students' privacy rights in managing learning analytics.</li> <li>● Exploitation of learning analytics to perform part of the assessment.</li> <li>● Use of assessment strategies for evaluating the impact of new technologies on the training experience.</li> <li>● Assessment based on individual and group activities.</li> <li>● Provision of an assessment procedure during the enrollment phase.</li> </ul>
<p>Recognition of competences</p> 	<ul style="list-style-type: none"> <li>● Recognition of the courses' results in the form of ECTS.</li> <li>● Recognition of both formal and informal learning.</li> <li>● Availability of a clear quality assurance system.</li> <li>● Use of micro-credentials to certify the competences acquired in the course of specific and short programmes.</li> <li>● Use of micro-credentials to attest the acquisition of transversal and cross-functional skills.</li> </ul>



## 4. RECOMMENDATIONS FOR INTRODUCING DIGITAL LEARNING IN TRADITIONAL EDUCATIONAL CONTEXTS BASED ON THE DIGCOMPEDU FRAMEWORK

In the following tables, based on the key-elements and sub-elements of DigCompEdu framework, you will find a selection of **recommendations and suggestions** which must be kept in mind when encompassing the digital technologies in traditional training and learning contexts within educational organizations.

The recommendations are aligned with the thematic fields identified by the DigCompEdu<sup>5</sup> framework which describes 22 competences educators should master, organized in six areas. Here below you will find a list encompassing the main key areas with the most relevant competences reported in the DigCompEdu framework.

### 1) **Contents and curricula creation**

- selecting
- creating & modifying
- managing, protecting, sharing
- information & media literacy
- communication
- contents creation
- responsible use
- problem solving

### 2) **Teaching and learning practices**

- teaching
- guidance
- collaborative learning
- self-regulated learning
- accessibility & inclusion
- differentiation & personalization
- actively engaging learners
- organizational communication
- professional collaboration
- reflective practice
- digital CPO (chief privacy officer)

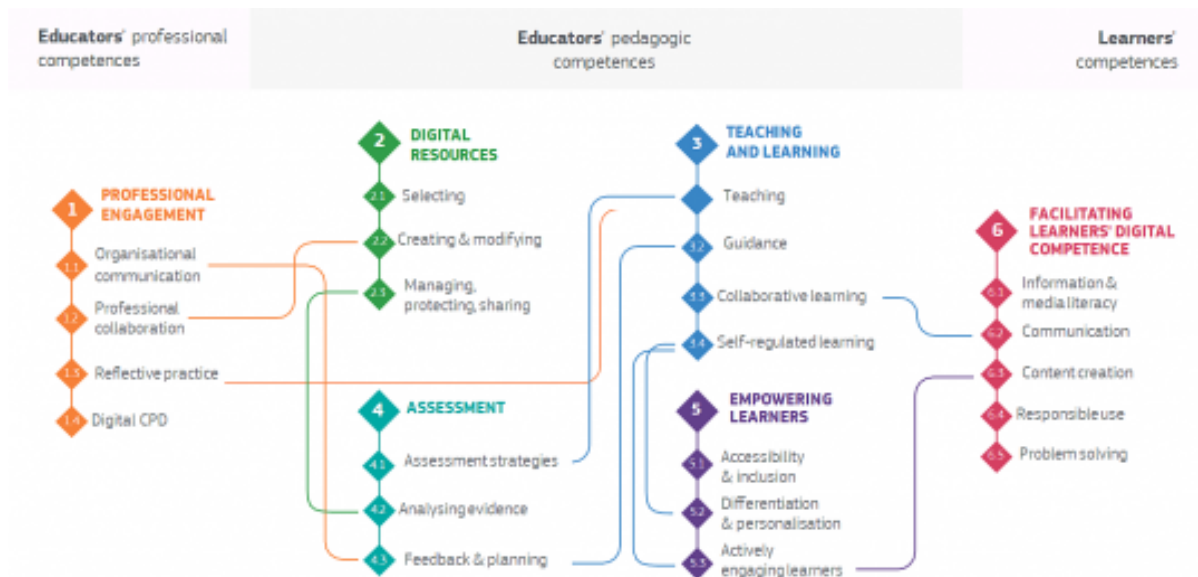
### 3) **Assessment practices**

- assessment strategies
- analyzing evidence
- feedback & planning

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<sup>5</sup> For further information about the DigCompEdu framework, please [click here](#).

**Fig.3 Key competences and areas of DigCompEdu**



Hereafter you will find three tables, pointing out the three main pedagogical areas which are described in the DigCompEdu framework (see fig.5 - in the list at page 6 you will view the DigCompEdu competences splitted into each of them). Into each of these areas we have described the most relevant activities that educators should master in order to cope with the challenge of digital transformation of educational contexts.

#### 4.1 Contents and curricula creation

<p><b>Contents and curricula creation</b></p>	<p>Digital contents and OERs are widely promoted and used</p>	<ul style="list-style-type: none"> <li>-Promote the creation of content by teachers and students.</li> <li>-Create open contents' repositories which are accessible and user-friendly (see chapter 6.3).</li> <li>-Make sure that digital tools and contents are licensed, as required.</li> </ul>
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		<ul style="list-style-type: none"> <li>-Check the reliability of contents' online sources.</li> <li>- Respect intellectual property and copyright (link to Addendum 1) and promote the use and sharing of Open Educational Resources (OERs) and the recognition of reliable providers.</li> </ul>
	<p>Curricula are redesigned or re-interpreted to reflect the pedagogical possibilities afforded by digital technologies</p>	<ul style="list-style-type: none"> <li>-Reschedule the time and place of learning.</li> <li>-Reshape subject-based learning to create more integrated approaches.</li> <li>-Promote learning in authentic contexts.</li> <li>-Provide digital learning across curriculum areas.</li> <li>-Develop students' digital competences across the curricula.</li> </ul>

## 4.2 Teaching and learning practices

<p><b>Teaching and learning practices</b></p>	<p>Digital competences are promoted, benchmarked and assessed</p>	<ul style="list-style-type: none"> <li>-Check that staff and students are digitally-competent.</li> <li>-Foreground safety, risks and responsible behaviors in online environments.</li> <li>-Benchmark the digital competences of staff and students.</li> <li>-Include digital competences in staff appraisal.</li> </ul>
	<p>A rethinking of roles and pedagogical approaches takes place</p>	<ul style="list-style-type: none"> <li>-Regard staff members as partners.</li> <li>-Envisage new roles and competence for staff.</li> <li>- Envisage new roles for students, fostering a students-centered environment.</li> <li>-Define a clear instructional design, using models as ADDIE (see chapter 5.1).</li> <li>-Define a micro-instructional design scheme as the Laurillard’s conversational framework (see chapter 5.2).</li> </ul>



		<ul style="list-style-type: none"> <li>-Enforce the collaborative learning and the group work, using models as the “Five Stages” (see chapter 5.3).</li> <li>-Provide a clear instructional scaffolding deemed as a guidance from teachers and tutors to facilitate students to achieve their learning goals (see chapter 5.4).</li> <li>-Expand and diversify the pedagogical approaches.</li> <li>-Develop tailor-made and personalized learning experiences.</li> <li>-Promote creativity.</li> <li>-Enhance social and emotional skills.</li> <li>-</li> </ul>
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### 4.3 Assessment practices

<p><b>Assessment practices</b></p>	<p>Assessment formats are engaging and motivating</p>	<ul style="list-style-type: none"> <li>-Extend the scope of formative assessment.</li> <li>-Diversify the summative assessment.</li> </ul>
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		<ul style="list-style-type: none"> <li>-Promote self- and peer-assessment.</li> <li>-Encourage rich, personalized and meaningful feedback.</li> <li>-Use constructive alignment to achieve maximum learning benefits and outcomes.</li> <li>-Consider the use of micro-credentials and digital badges to assess the acquired competences and skills.</li> </ul>
	<p>Informal and non-formal learning are recognized</p>	<ul style="list-style-type: none"> <li>-Recognize experiential and open learning.</li> <li>-Promote bottom-up and students-centered learning approaches.</li> </ul>
	<p>Learning design is informed by analytics</p>	<ul style="list-style-type: none"> <li>-Base your instructional design approach on learning analytics.</li> <li>-Support learning delivery and adaptation through learning analytics.</li> <li>-Support quality management and curriculum/programme design through learning analytics.</li> </ul>





		-Pay attention to students' privacy rights.
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#### 4.4 Best practices in the selected DigCompEDU areas

Hereafter you will find a table which links the activities highlighted in the table above to the 4 selected best practices of outstanding academic institutions at EU level. For each of them we have pointed out the new activities which have been developed in the three macro-areas of DigCompEdu described in the preceding paragraphs. The evidence reported hereafter results from in depth interviews which have been conducted by project partners with a pool of selected contact persons.

Case	Contents and curricula creation	Teaching and learning practices	Assessment practices
<a href="#">Politecnico di Milano</a>	<ul style="list-style-type: none"> <li>- Promote the creation of content by teachers and students.</li> <li>- Create open contents' repositories which are accessible and user-friendly.</li> <li>- Provide digital learning across curriculum areas.</li> <li>- Develop students' digital competences across the curricula.</li> </ul>	<ul style="list-style-type: none"> <li>- Check that staff and students are digitally-competent.</li> <li>- Benchmark the digital competences of staff and students.</li> <li>- Envisage new roles and competence for staff.</li> <li>- Envisage new roles for students, fostering a students-centered environment.</li> <li>- Define a clear instructional design, using models as ADDIE.</li> <li>- Define a micro-instructional design scheme as the Laurillard's conversational framework.</li> <li>- Expand and diversify the pedagogical approaches.</li> </ul>	<ul style="list-style-type: none"> <li>-Extend the scope of formative assessment.</li> <li>-Promote self- and peer-assessment.</li> <li>- Consider the use of micro-credentials and digital badges to assess the acquired competences and skills.</li> <li>- Promote bottom-up and students-centered learning approaches.</li> </ul>



		<ul style="list-style-type: none"> <li>- Develop tailor-made and personalized learning experiences</li> <li>- Promote creativity.</li> </ul>	
<a href="#">FH Muenster University of Applied Science</a>	<ul style="list-style-type: none"> <li>- Create open contents' repositories which are accessible and user-friendly.</li> <li>- Reschedule the time and place of learning.</li> <li>- Reshape subject-based learning to create more integrated approaches.</li> <li>- Provide digital learning across curriculum areas.</li> </ul>	<ul style="list-style-type: none"> <li>- Envisage new roles for students, fostering a students-centered environment.</li> <li>- Enforce collaborative learning and group work, using models as the "Five Stages".</li> <li>- Provide a clear instructional scaffolding deemed as a guidance from teachers and tutors to facilitate students to achieve their learning goals.</li> <li>- Expand and diversify the pedagogical approaches.</li> <li>- Develop tailor-made and personalized learning experiences.</li> <li>- Enhance social and emotional skills.</li> </ul>	<ul style="list-style-type: none"> <li>- Extend the scope of formative assessment.</li> <li>- Diversify the summative assessment.</li> <li>- Promote self- and peer-assessment.</li> <li>- Promote bottom-up and students-centered learning approaches</li> </ul>
<a href="#">ESI-CEE</a>	<ul style="list-style-type: none"> <li>-Create open contents' repositories which are accessible and user-friendly.</li> <li>- Reshape subject-based learning to create more integrated approaches.</li> <li>-Provide digital learning across curriculum areas</li> </ul>	<ul style="list-style-type: none"> <li>- Envisage new roles and competence for staff.</li> <li>- Envisage new roles for students, fostering a students-centered environment.</li> <li>-Define a clear instructional design, using models as ADDIE.</li> <li>- -Enforce the collaborative learning and the group work, using models as the "Five Stages".</li> </ul>	<ul style="list-style-type: none"> <li>-Extend the scope of formative assessment.</li> <li>- Diversify the summative assessment.</li> <li>- Encourage rich, personalized and meaningful feedback.</li> <li>- Use constructive alignment to achieve maximum learning benefits and outcomes.</li> <li>-Recognize experiential and open learning.</li> </ul>



		<ul style="list-style-type: none"> <li>- Provide a clear instructional scaffolding deemed as a guidance from teachers and tutors to facilitate students to achieve their learning goals.</li> <li>- Expand and diversify the pedagogical approaches.</li> <li>- Develop tailor-made and personalized learning experiences.</li> </ul>	<ul style="list-style-type: none"> <li>- Promote bottom-up and students-centered learning approaches.</li> </ul>
<p><a href="#">Algebra University College</a></p>	<ul style="list-style-type: none"> <li>-Create open contents' repositories which are accessible and user-friendly.</li> <li>-Make sure that digital tools and contents are licensed, as required.</li> <li>- Reschedule the time and place of learning.</li> </ul>	<ul style="list-style-type: none"> <li>-Check that staff and students are digitally-competent.</li> <li>-Envisage new roles and competence for staff.</li> <li>- Envisage new roles for students, fostering a students-centered environment.</li> <li>-Define a clear instructional design, using models as ADDIE.</li> <li>-Define a micro-instructional design scheme as the Laurillard's conversational framework.</li> <li>- Enforce collaborative learning and group work, using models as the "Five Stages".</li> <li>-Provide a clear instructional scaffolding deemed as a guidance from teachers and tutors to facilitate students to achieve their learning goals.</li> </ul>	<ul style="list-style-type: none"> <li>-Extend the scope of formative assessment.</li> <li>-Diversify the summative assessment.</li> <li>-Use constructive alignment to achieve maximum learning benefits and outcomes.</li> <li>-Support learning delivery and adaptation through learning analytics.</li> <li>-Pay attention to students' privacy rights.</li> </ul>

		-Develop tailor-made and personalized learning experiences.	
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#### 4.5 Envisioning the future trends of digital pedagogy

The rapid advancements in technology have triggered the explosion of the volume of digital-based training experiences, facilitating the students' community to acquire skills through various forms of digital content. This has come along with a new approach to learning, based on collaboration and peer-to-peer learning, but also with new roles and competences for teachers and trainers. Students increasingly perceive the importance of digital pedagogy and it is therefore predictable that an ever greater recourse to digital-based learning will characterize the near future.

Among the emerging trends which will affect the way in which education will be delivered, we can mention:

- the centrality of students' communities, transforming the traditional top-down teaching into new pedagogical styles, based on the progressive transfer of the training subjectivity from teachers to trainees;
- the changing roles of teachers, requested to progressively assume the task of facilitators of the training process and to support the students' centrality through a systematic scaffolding, deemed as a guidance from teachers and tutors to facilitate students to achieve their learning goals;
- the affirmation of new competences and roles by teachers, embracing not just the pedagogical, but also the social, managerial and technical dimensions of the digital training;
- the growing need for instructional design practices to blend and detailed design the teaching and learning experience in a fully online or hybrid setting;
- the increasing recourse to Open Educational Resources (OERs) with a focus on contents' reliability as well as on the selection of adequate and qualified repositories;
- the promotion of contents' creation by students;
- the attention to intellectual property rights and creative commons rules;
- the introduction of new assessment methodologies, benefitting from the collection of learning analytics and big data and using the constructive alignment to achieve maximum learning benefits and outcomes;
- the spread of new recognition tools as micro-credentials and digital badges, which enhances the certification of small and easily transferable competences and skills;
- the emerging of privacy rights' challenges.

## 5. PEDAGOGICAL MODELS

The digitalization of pedagogy can benefit from tailored instructional design models which lend themselves to be adopted by teachers to improve the impact of training activities and fully exploit the potentials stemming from the massive use of digital technologies. We have selected hereafter three of them which are acknowledged in the literature for being effective and easily transferable:

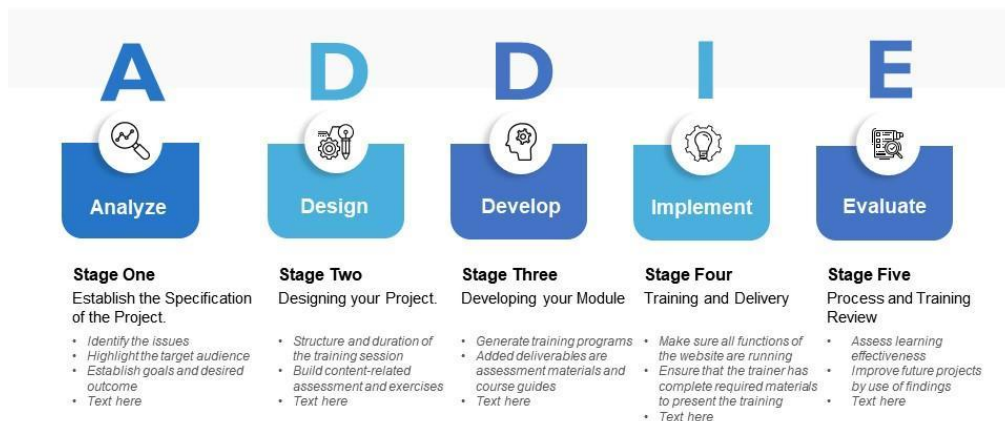
- the **ADDIE Model** (acronym for Analyze-Design-Develop-Implement-Evaluate) for the macro-design activities, which can be presented as a systematic approach to Instructional Design, a sort of umbrella under which a wide range of models is gathered.
- The **Laurillard's Conversational Framework** for micro-design, which is focused on the way in which students learn, by creating the best possible conditions for them to fruitfully and effectively acquire and develop new knowledge, making use of new media and technologies and benefitting from peer-to-peer learning and a students-centered approach.
- The **Five Stages Model** for micro-design collaborative learning in an online/blended setting, providing a framework for a structured program of e-tivities, while offering essential support and development to participants at different stages of their learning process.

When it comes to the delivery the above models should be combined with **Instructional Scaffolding** which can be defined as a guidance from teachers and instructors to support students to achieve their goals in learning, providing students with clear instructions during the early stage of learning before slowly shifting the responsibility to them as they develop their own understanding and ability to work in a digital setting and with peers.

## 5.1 The ADDIE Model of Instructional Design

# ADDIE Model of Instructional Design

This slide is 100% editable. Adapt it to your needs and capture your audience's attention.



- **Analysis:** this first step can be defined as a sort of recognition about whatever can offer useful insights for the subsequent design phase, as the collection of training needs and its goals, the users' profiling and expectations' analysis, the infrastructural, technological and economic constraints which can influence the instructional design process.
- **Design:** along with the stages of development and implementation, it represents a key phase which can lead to the success or failure of a training path. During the design step, attention should be targeted at training objectives, at the methodologies for measuring their achievement as well as at the pedagogical strategies through which those objectives are pursued.
- **Development:** this is the phase in which the course is given operativity, figuring out the activities, arranging the training and evaluation materials, setting a timeline for the delivery, and designing the organizational layout of the course. In this frame, it is usually foreseen the search for available pedagogical materials as well as for eventually available online resources (as OERs). This is the stage in which the development of e-contents is usually provided, apart from networked collaborative learning (NCL), based on collaborative strategies, where e-contents generation is not so crucial.
- **Implementation:** design and development are followed by the implementation/delivery of the training course, a stage in which students benefit directly and autonomously from the resources at their disposal. Conversely, in a networked collaborative learning course, this phase stands out for the most intensive social interaction among students, teachers, tutors...It


is the moment in which designers (teachers) and users (students) can interact on the same floor, giving to the former the possibility to adapt parts of the training contents to the specific needs which could eventually arise during the delivery in a sort of “adaptive design”.

- **Evaluation:** the evaluation phase can be regarded as cross-sectional, affecting both the design process as a whole and the delivery. As far as the design process is concerned, evaluation refers to the ongoing assessment of what is defined and developed while the course takes place, while the impact on delivery is bound to the level of appreciation and efficacy reported by the participants. The assessing activities carried out during the delivery are determinant to point out enhancement opportunities for the subsequent edition.

How technologies can reshape teaching and learning? The Bloom’s digital taxonomy below offers insights on possible types of digital activities a teacher can include in its course design according to the concerned learning goal.

#bitesizePD

## Bloom’s Digital Taxonomy



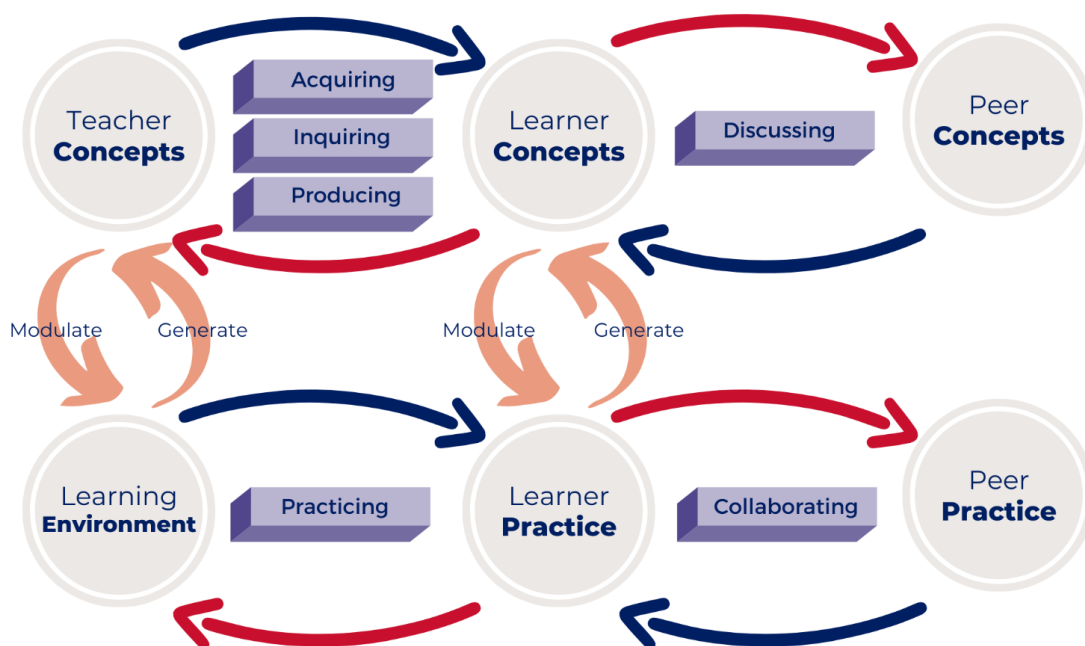
Bloom's taxonomy	Bloom's modified taxonomy	Bloom's extended digital taxonomy	Functional Levels	Activities with digital tools	
		Sharing	Publicly sharing, publishing, broadcasting	Contributing to open social networks, publishing, broadcasting, networking	Higher Order Thinking Skills ↑
Evaluation	Creating	Creating	Designing, constructing, planning, producing, inventing, devising, making	Programming, filming, animating, blogging, video blogging, mixing, re-mixing, wiki-ing, videocasting, podcasting, directing	
Synthesis	Evaluating	Evaluating	Checking, hypothesising, critiquing, experimenting, judging, testing, detecting, monitoring	Blog commenting, reviewing, posting, moderating, collaborating, refactoring, testing	
Analysis	Analyzing	Conceptualizing	Comparing, organising, deconstructing, attributing, outlining, finding, structuring, integrating	Hacking, mashing, linking, validating, reverse engineering, cracking	
Application	Applying	Applying	Implementing, carrying out, using, executing	Running, loading, playing, operating, uploading, sharing with group, editing	
Comprehension	Understanding	Connecting	Interpreting, summarizing, inferring, paraphrasing, classifying, comparing, explaining, exemplifying	Boolean searches, advanced searches, blog journaling, tweeting, categorizing, tagging, commenting, annotating, subscribing	
Knowledge	Remembering	Doing	Recognizing, listing, describing, identifying, retrieving, naming, locating, finding	Bullet pointing, highlighting, bookmarking, group networking, shared bookmarking, searching	Lower Order Thinking Skills ↓

## 5.2 The Laurillard's Conversational Framework

**Laurillard's Conversational Framework (CF)** is a distillation of many theories of learning to support teachers in micro-designing for learning. It provides an overarching theoretical design framework for thinking about how best to assist and encourage learning using technology to support meaning-making.

The CF places the individual learner at the center and embraces six main types of learning, demonstrating how each of the cycles of iterative activity helps students develop their understanding between the concepts and their application in practice. In formal education, learners can receive help from both the teacher and other learners. At the upper level of the framework depicts these interactions and every interaction is an opportunity to develop their understanding of the concepts.

At the lower level, the teachers and students' model and share their practice through actions and feedback in a special learning environment. All those interactions are an opportunity to develop their skills in applying the concepts in practice. By integrating conceptual understanding and application in practice, the learner is able to maximize their opportunities for feedback, and ultimately, learning.



Using the conversational Framework for designing online or hybrid learning modules means combining in a consistent way the different student learning styles into the program and leveraging on technologies for executing the different actions (Acquisition, Discussion, Investigation, etc).

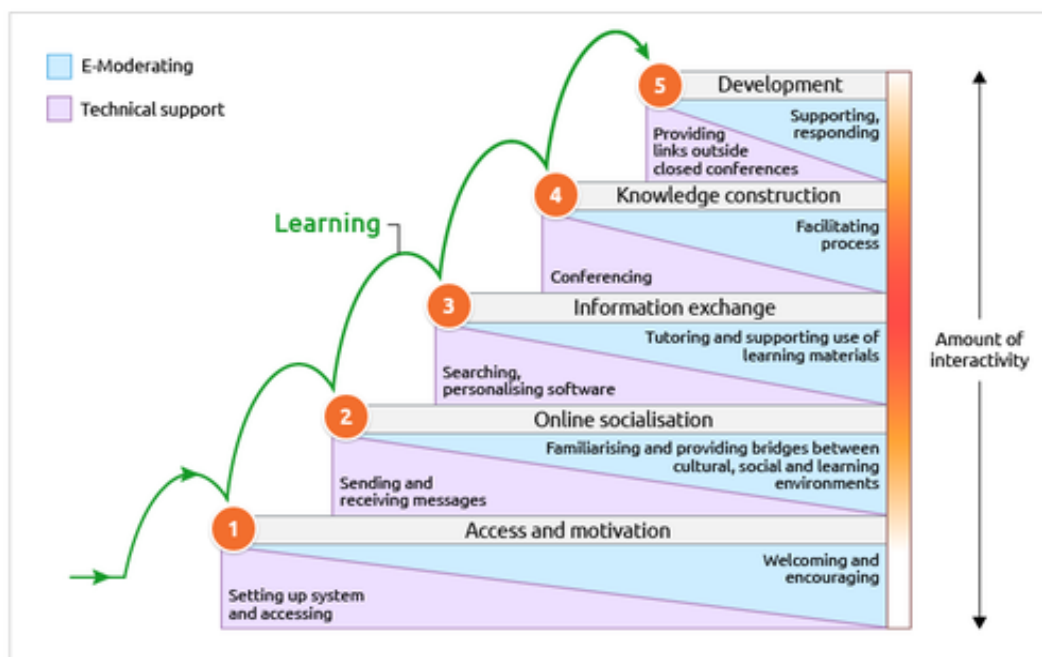


### Learning styles in Laurillard's model

Learning through	What makes the student
Acquisition	Listens a podcast/presentation, reads books or online resources, watches videos or demos.
Discussion	Expresses ideas or asks questions, reacting to stimulations or requests coming from the trainer or from other students.
Investigation	Explores, makes confrontation and critically analyzes information, documents and resources which reflect the contents of training.
Practice	Puts in practice, experiments, adapting his/her action to the training goals, using feedback to improve his/her action.
Collaboration	Makes use of discussion, practice and production to create shared knowledge together with his/her peers.
Production	Expresses an individual output, what he/she has learnt, his/her current conceptualization of the topic and how he/she has put in practice the acquired knowledge.

### 5.3 The Five Stages model

In order to make online collaborative learning effective and satisfying, participants need to be supported through a structured development process. The **Five Stages model** provides a scaffold for a structured and articulated programme of online activities (e-tivities), offering to the trainees an essential support in each phase of the training programme while they accumulate experience in the online learning.



- **Stage 1 (Access and motivation):** at stage 1 learners are still transitioning into the digital-based learning environment. They are able to access learning everywhere, integrating into their everyday life digital devices which are mobile, transportable and inter-connected across time, location, culture and experience. At this stage, learners know that technical assistance is available, if needed. E-moderators are ready to welcome them as they begin their learning journey.
- **Stage 2 (Online socialization):** at stage 2 learners start to advance into their network, benefitting from connectedness. This comes along with the fact they bring their own language, anxieties, hopes and experiences. In this frame, the e-Moderator acts as a host through the framework and web of e-tivities. Participants experience online socialization and create the basis of their own micro-community.
- **Stage 3 (Information exchange):** at stage 3 learners get stuck into information exchange and achieve cooperative tasks, interacting with the Moderator and with the sparks to start the

dialogue around the e-tivities. In this phase, they increasingly benefit from the relations with their learning peers, starting to learn how to manage their time.

- **Stage 4** (Knowledge construction): at stage 4 learners are increasingly able to take control of their own learning, becoming an effective part of the knowledge community. Within the group, they start to be appreciated for their role. The e-Moderator provides guides for the activities along with the foreman of the group, helping the participants to head towards the achievement of their goals.
- **Stage 5** (Development): at stage 5 participants become more confident both as online learners and members of the group. They are able to build on the ideas acquired during the e-tivities and to integrate them into their own context and workplace. They enjoy looking back and learning afresh from the whole experience, preparing to set out on new journeys. They deploy their new knowledge to demonstrate achievements in assessment.

### How to design the activity for each stage? The e-tivity

The e-tivity is a tool which can be exploited for designing an online activity aimed at activating the process of collaborative learning. It consists of:

- a brief information, challenge or spark;
- online activities which involve participants who are expected to give/publish a contribution;
- an interactive or participative element as answering to others' contributions, giving feedback or coping with the critics from an electronic moderator (the plenary session).

### Why use e-tivities?

- to connect objectives with activities;
- to give punctual instructions regarding what, how and when;
- to attach the most suitable contents to the activities;
- to define role and tasks of the tutor/facilitator as well as the evaluation criteria

### E-tivity template

<p><b>Title</b></p>	<p>A short title that intrigues and calls for participation.</p>
<p><b>Goals</b></p>	<p>Explain the goal:</p> <ul style="list-style-type: none"> <li>● If you complete this activity you will be able to .../ better understand how...</li> <li>● Use verbs.</li> <li>● It links the objectives of the e-tivity to those foreseen by the course.</li> </ul>



<b>Activity overview</b>	<p>Explain briefly what the activity will be about.</p>
<b>Spark</b>	<ul style="list-style-type: none"> <li>● Offer ideas related to the theme of the activity, which are able to activate reflection and discussion.</li> <li>● The spark can be a video, an article, a publication, a case, a presentation, ect (OER or a licenses resource).</li> <li>● Must be appropriate to the target and its characteristics (knowledge, time available).</li> <li>● Must be “relevant” and “credible”.</li> </ul>
<b>Number of envisaged participants</b>	<p>Specify if the activity should be carried out individually or in a group, if in a group with whom.</p>
<b>Design</b>	<p>Explain how the activity will be structured.</p>
<b>Role of the Tutors</b>	<p>Explain clearly:</p> <ul style="list-style-type: none"> <li>● What the tutor will do and when.</li> <li>● When the tutor will return the feedback and how.</li> </ul>
<b>Participants tasks</b>	<p>Give precise indications on:</p> <ul style="list-style-type: none"> <li>● what the single learner has to do with the Spark (s);</li> <li>● what do you expect the individual learner to do / produce, using what media and where should he/she posts his/her contribution (specific area in the VLE);</li> <li>● specify the expected contribution length;</li> <li>● request a response / comment to the other students’ posts, specify what kind of answer, method, length and where to post;</li> <li>● key point: people log in to see if they have received answers. Make this happen!</li> </ul>

<b>Duration and deadlines</b>	<ul style="list-style-type: none"> <li>• Total duration foreseen for the activity.</li> <li>• Deadlines for each task in the activity.</li> </ul>
<b>Next</b>	If you want to provide additional content to learn more, specifying whether they are mandatory or optional to carry out the activities.
<b>Assessment methods</b>	<p>To indicate the evaluation methods and related indicators.</p> <p>You can decide whether to make this section visible or not to your learners</p>

## 5.4 The Instructional Scaffolding

The **Instructional Scaffolding** consists of the temporary support which is provided by the teacher in order to help students to achieve a goal which would be otherwise out of their reach. This concept sinks its roots in the Vygotsky theories about the Zone of Proximal Development (ZPD).

In a digital or blended educational setting, there are four different kinds of scaffolding to be provided:

- **procedural**: enables students to the use of technologies/environments/processes;
- **strategic**: enhances students' active participation as well as their communication and online cooperation and organization;
- **conceptual**: helps students to conceptualize knowledge and to consolidate their understanding and practices;
- **meta-cognitive**: helps students to reflect upon how they have achieved new knowledge and abilities.

### Scaffolding techniques

#### To foster engagement:

- Clarify/negotiate the course objectives, how the course works and the envisaged workload for participants and be sure the trainees are happy with these.
- Offer very clear guidelines and instructions to use the technology.
- Be present to promptly solve any technical and organizational problem.
- Facilitate mutual knowledge and informal exchange among learning groups' members.

#### To fill any gap in the online discussion/knowledge generation process by the learning group:

- Emphasize and extend a point from a participant's message - to show wider or more generic application.
- Collect 3 or 4 snippets from different messages together and represent in a new light.
- Highlight an issue or topic from one discussion that links with others.
- Agree or disagree with reasons to refocus the discussion.
- Highlight key issues to encourage two or three final contributions before summarizing.

### **To help organize the learning groups' knowledge (scaffolding – Output Book)**

- Collect all the relevant messages into one document.
- Shorten the sentences, delete all unnecessary material.
- Add your teaching comments or critique, point out omissions, other perspectives or applications, and make reference to further literature or ideas.
- Add a short, further example of your own if necessary.
- Add a question or reflection for further consideration, if appropriate.
- Add further reading or follow up if appropriate (preferably electronically sourced).
- Thank and praise the participants who contributed. End with congratulations, praise or a positive note of some kind.

## 6. ADDENDUM 1

### OERs and creative commons usage rights

#### 6.1 Categories of OERs providers

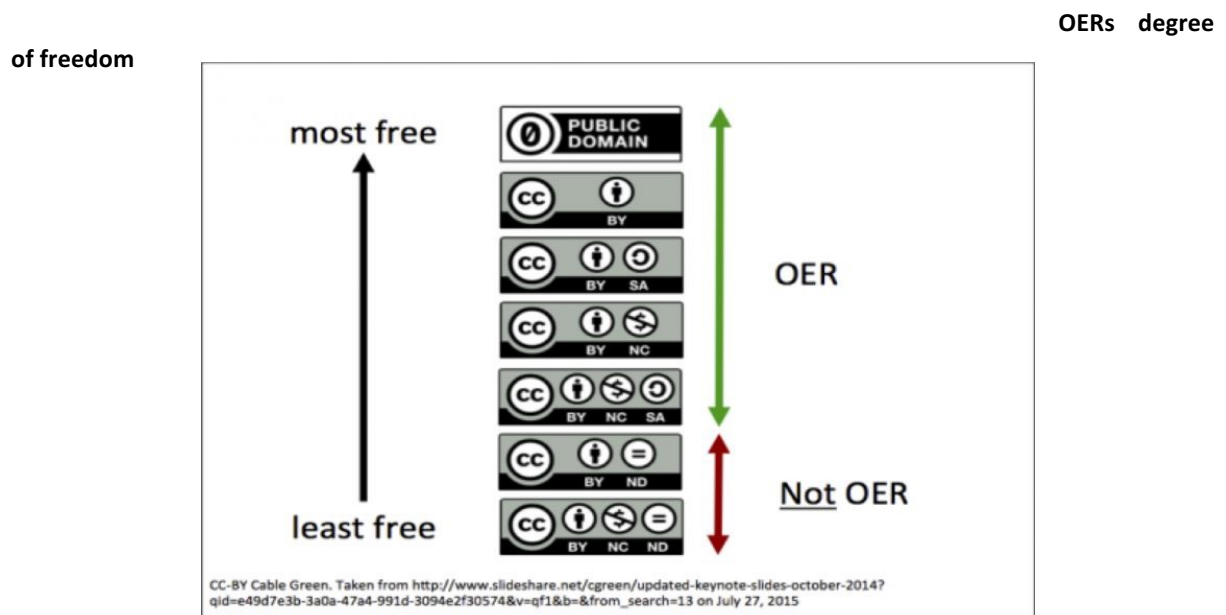
Open Educational Resources (OERs) are teaching, learning and research materials based on different kinds of support (digital or not). They are in the public domain and open licensed. This means that whoever can legally and freely copy, use, adapt and share them. The OERs can be exploited with different aims:

- to collect contents from the “best in class”;
- to create personalized materials for each class;
- to improve one’s own training materials - by allowing the adaptation of materials from people coming from all over the world, an OER’s creator has the possibility to see an innovative and not imaginable use of his/her materials;
- to gain access to a wide selection of materials from which to draw for his/her training activities.

Open Educational Resources (OERs) can be regarded as the key-resource for contents’ curators and co-designers. OERs can be defined as materials that reside in the public domain or are under copyright which have been released under an open license which allows users to hold a copy, to re-use and share them for free. In most cases, these open licenses aim at promoting innovation through adaptation and re-mixing of contents by final consumers, who turn therefore into prosumers.

These materials are commonly released in digital form to facilitate sharing and to make information available anytime and anywhere. OERs are a relatively new phenomenon which may be well seen as part of a larger trend towards openness in higher education, including more well-known and established movements such as Open Source Software (OSS) and Open Access (OA).

Here below you will find a table which shows the openness degree of the creative commons licenses. The ones which are not editable cannot be regarded as “open” and therefore they are not OERs in a strict sense.



Source: [University of New England](http://www.unnewcastle.ac.uk)

## 6.2 Intellectual property rights and licenses types

When working with contents produced by others (OERs, photos downloaded from the internet, audio files, among others) one of the main difficulties is to determine if the content is indeed open and to what extent it can be used or remixed (modified). To avoid copyright infringement, understanding the different 'levels' of intellectual property rights is crucial. Intellectual property rights is a complex topic because it is ruled by different levels of legislation.

Notwithstanding, the [Creative Commons](#) (CC) taxonomy offers an excellent framework of reference. There are basically 4 types of rights ruled by the Creative Common framework:



### Attribution

You can use it, but you must credit the original author.



### Noncommercial

You can use it, but not for making money..



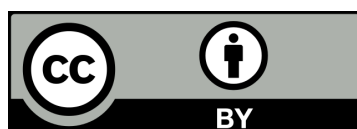
### Non- Derivatives

You can use, but not make any changes to the original material.

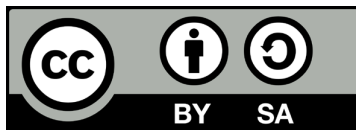


### Share alike

If sharing, you must use the same CC.



You can use, remix, share and make money with it as long as you credit the original author.



You can use, remix and share it, as long as you share under the same CC as the original and credit the author.



You can use, remix, share it but not make money with it. You must also credit the original author.

In addition to the Creative Commons framework, there are two other license types you should be familiar with:  
**public domain and all rights reserved.**



The public domain is not a license. Works enter into the public domain when copyright expires or where the creator waives intellectual property rights. Therefore, the public domain cannot legally be a license because there are no intellectual property rights which need a licensee for usage.



All Rights Reserved is a fully protected material. You cannot use materials with this license unless the author grants you explicit permission to use it.



### 6.3 OERs' contents repositories

Open Educational Resources (OERs) are virtually infinite and constantly reviewed and expanded. OERs are often organized and stored in what is called OERs repositories— a central place where aggregation of OERs are kept and maintained. Hereafter you will find a selection of both university and non university OERs repositories which have been mapped and analyzed in the [e-LEAD SPEED Trainers' Toolkit](#).

#### University repository

- [The Economic Network](#): it provides publications, events, and other resources to support university teachers of economics throughout the UK and worldwide.
- [OpenLearn](#): OpenLearn is the home of free learning from the UK's largest university, The Open University.
- [Open courseware in management](#): collection of course material in management related subjects.
- [Open Learning Initiative](#): the Open Learning Initiative (OLI) is a grant-funded group at Carnegie Mellon University, offering innovative online courses to anyone who wants to learn or teach. The number of courses available is quite low. Enrolment to classes is required to access resources.
- [Open Michigan](#): Open.Michigan enables faculty, students, staff and others to share educational resources and research with the global learning community.
- [Openverse](#): Openverse is an open-source search engine for open content developed as part of the WordPress project. It searches Creative Commons licensed and public domain content from dozens of different sources. The software is licensed under the MIT License. Openverse indexes over 700 million items.
- [MIT Open Courseware](#): MIT Open Courseware is a web-based publication of virtually all MIT course content. OCW is open and available to the world and is a permanent MIT activity.
- [Oxford's open collections](#): the Open Course Library (OCL) is a collection of shareable course materials, including syllabi, course activities, readings and assessments designed by teams of college faculty, instructional designers, librarians and other experts.

#### Non university repository

- [Saylor Academy](#): it offers courses assembled with OERs from various sources. Courses are peer reviewed.
- [OpenStax CNX](#): OpenStax CNX provides a variety of courses assembled using OERs. It's owned by a no profit organization founded by Bill and Melinda Gates.
- [Khan Academy](#): Khan Academy offers practice exercises, instructional videos and a personalized learning dashboard that empower learners to study at their own pace in and outside of the classroom.

In addition to OERs prepared by others, you might want to design your own learning materials. For that, the Internet offers a number of free tools that can significantly improve the quality of the materials you produce, consequently increasing learners' engagement. Examples include software to design quizzes and games, stock of free images, video and music editing programs, tools to design infographic and mind maps, to name a few.

The list below offers examples of different types of free tools available on the Web.

- **Survey, polls and quizzes:** Google forms, Scattervox, AnswerGarden, Google forms, Scattervox, AnswerGarden, Addpoll, SurveyMonkey, Survs.
- **Stock photos:** Image after, Morguefile, Freeimages, Fotolia, Pexels.
- **Video editing:** Lightworks, Avidemux, VideoPad video editor, VSDC.
- **Presentation:** Photo peach, Google slides, Slide Dog, Sozi.
- **Mind mapping:** Mindmup, Coggle, FreeMind, MindMap free.
- **Audio and podcast:** Audacity, Ardour, Mp3 my mp3, Podomatic, Easypodcast.
- **Background music:** JewelBeat, Incompetech, iBeat, Bump Foot, Beatpick, Archive.org.
- **Bibliography and citations:** EasyBib, Zotero, Bibme, Citation Machine.
- **Text to speech:** Chrome speak, Announcify, Fox Vox, Natural reader, Power talk.
- **Digital storytelling:** Storify, Storybird, Cartoonist, Capzles.
- **Infographic and diagrams:** Piktochart, Easilly, Dipity, Google charts, Gliffy, Wordle.



## Collection of best practices and development of case studies

### 1. Foreword

This **Collection** represents the **Project Result 4 (R4), Activity 4 (A4)**, of the Erasmus+ KA2 KA220-HED-DAAC2117 “**Digital Transformation of Higher Education and Training**” (DigiTransformEdu) project. This intellectual output and related activities were led by the project partner institution Fondazione Giacomo Brodolini (Italy), in collaboration with all other project partners.

The project DigiTransformEdu is a 26-month Erasmus+ project (2021-2023) that aims to foster the digital transformation of higher education (HE) and tertiary vocational education and training (VET) institutions by promoting the development of a digital culture and supporting institutional leadership to pursue digital strategy at institutional level and encouraging the digitalization of educational processes and promoting effective digital-age learning by integrating the DigCompOrg and the DigCompEdu frameworks, among other objectives. The project is centered on the transformation to digital/online education which is defined as a distance form of education, in which digital tools and information and communication technologies are used to enable teaching, learning, assessment, certification, and the organization of the educational process, while learners, teachers, and administrators might be located in different places and the process might be either synchronous or asynchronous in time.

R4 results from the following tasks which have been implemented in the course of the project:

- R4/A1: Qualitative analysis for case preparation.
- R4/A2: Literature review.
- R4/A3: Blueprint for digital pedagogy.

The blueprint includes the following sections:

- Successful cases,
- Inventory of approaches and tools for the design and delivery of digital education.
- Inventory of approaches and tools for the assessment of digital education.
- Most diffused technologies and digital tools in support to the design, delivery and assessment of digital and blended learning.
- Guidelines and recommendations to educators and managers for enabling the transition.

A4 refers to the **Collection of best practices** (1 for each partner country) which have been investigated through in-depth interviews conducted by the project partners. This task is focused on developing,

describing and presenting the selected case studies in the pedagogical approach to digital transformation within the frame of five pedagogical areas:

- Curriculum design.
- Delivery: teaching.
- Delivery: learning.
- Assessment.
- Recognition.

All R4 documents are designed as standalone papers, but consequently will be published as an integrated publication and made available electronically through the [DigiTransformEdu](#) project website.

## 2. Introduction

During 2022 and 2023, DigiTransformEdu project partners have mapped the digital readiness and resilience of HE/VET institutions in response to the COVID crisis in the context of governance and enabling services, teaching and learning practices and infrastructure in Bulgaria, Croatia, Germany, Italy and EU. Project partners also collected information about concepts and frameworks, examined case studies and best practices and outlined a blueprint for the pedagogical and strategic approach to digitalisation of higher education (HE) and tertiary vocational education and training (VET) institutions.

DigiTransformEdu project partners have then worked on the identification and description of a template structure for the development and presentation of the selected best practices in the pedagogical and strategic approach to digital transformation. The aim of the project was to provide at least one best practice for each partner country, but the task was not limited to this goal. The direct output of this effort is the following collection of selected case studies. Case Study Document Template and its Vocabulary Descriptors constitute respectively Addendums I and II of this Collection.

### 3. Collection of selected case studies of best practices

This Collection of selected DigiTransformEdu case studies consists of four best practices presenting the references and experiences in the digital transformation conducted by the following educational institutions:

- The FH Münster University of Applied Sciences.
- The European Software Institute Centre Eastern Europe (ESI CEE).
- The Algebra University College.
- The Politecnico di Milano.
- The ITS “Mobilità” (Case Nuove, Varese)

The case studies were explored, designed and elaborated through a close collaboration between the respective national project partners and selected educational institutions in the first half of 2023.

Before selecting these best practices, DigiTransformEdu project partners mapped experiences and practices of how different educational institutions responded through administration, governance, use of pedagogy and technology to the COVID-19 crisis at national or international level. The findings of this mapping were published in the form of national and EU level reports<sup>6</sup> (Project Results 1 and 2 combined), where institutions for further study and exploration were identified and shortlisted. Consequently, a Case Study Document Template (Addendum I) and Vocabulary Descriptors (Addendum II) have been designed and agreed upon before the case study research and inquiry commenced.

By September 2023, the following best practices collection was presented.

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<sup>6</sup> DigiTransformEdu: Lessons Learned from the COVID-19 Crisis: Governance and Enabling Services, Teaching, Students and Infrastructure, ISBN 978-953-322-492-3.

### 3.1 Germany: FH Münster University of Applied Sciences

<b>Title</b>	Research Seminar for Master of International Marketing and Sales
<b>Institution</b>	FH Münster University of Applied Sciences
<b>Name of the Institution</b>	FH Münster University of Applied Sciences
<b>Country</b>	Germany
<b>Ownership</b>	Public
<b>HEI / VET</b>	HEI
<b>Type of Education</b>	Formal
<b>National Accreditation</b>	Yes (Akkreditierungsrat der Stiftung zur Akkreditierung von Studiengängen in Deutschland - German Accreditation Council)
<b>International Accreditation</b>	Yes (EFMD)
<b>Level of the case</b>	Course
<b>Typology</b>	
<b>Pedagogical Areas</b>	<p>Please select whether the case fits into the one or more of the following areas:</p> <ul style="list-style-type: none"> <li>● <b>Curricula design</b></li> <li>● <b>Delivery: teaching</b></li> <li>● <b>Delivery: learning</b></li> <li>● <b>Assessment (summative)</b></li> <li>● <b>Recognition of competence, attainments of related learning outcomes</b></li> </ul>
<b>Curricula design</b>	
<b>Approach</b>	<p>The course Research Seminar has been designed and continually optimized for the flexibility and individuality of students. It is a mandatory course for all master students of the EFMD accredited study program International Marketing and Sales at the FH Münster University of Applied Sciences. It is also offered to the Master students of the Master Digital Business and Innovation Management study program.</p> <p>The course can be held both virtually, hybrid, or face-to-face. In this way, students that might have a working student position or other (job) obligations in other cities or countries after their semester abroad also have the opportunity to fully participate.</p> <p>The course is fully hosted via the digital platform MS Teams, with multiple plug-ins being used to provide static and dynamic content (files, videos) and learning assessments (quizzes).</p> <p>Further, by providing in-depth knowledge about research methods, students are prepared not only for their subsequent master's thesis but also can gather insights that might lead to an academic career and the pursuit of a PhD.</p>
<b>Methods</b>	<p>The course adopts various methods in its pursuit of learning goals and learning outcomes. These range from self-learning by the students individually or in groups, pre-recorded videos, seminars with a teacher, to group consultations with supervisors.</p> <p>All content is shared via a pre-configured room in MS Teams where students get access to recommended and mandatory reading materials, videos, and quizzes. The room further contains specific channels for the groups that are assigned by the lecturer and each have a separate supervisor.</p>

<p><b>Planning</b></p>	<p>Teachers prepare an accurate lesson/course plan for students including learning goals, contents, delivery methods, schedule and timing of the activities, assessment methods and envisaged recognition. The course is mandatory prior to the final master thesis, ensuring that each student acquires the necessary methodological skills for this research-based work.</p> <p>Each semester, the course is given, accounting for the fact that the study program can be started in both semesters. Students are informed at the start of the course about its structure and intended outcomes as well as guiding signs and milestones throughout, to ensure successful completion, thus providing procedural scaffolding.</p>
<p><b>Delivery: teaching</b></p>	
<p><b>Preparedness</b></p>	<p>The research seminar content has been optimized over multiple semesters and each semester it is being reviewed regarding the relevance of each part and adequateness of methods and contents.</p> <p>FH Münster University of Applied Sciences provides consulting and courses for its lecturers to optimize their content. Further, various insights from research projects at the Science-to-Business Marketing Research Centre of the Münster School of Business have also been taken into account in the course preparation.</p>
<p><b>Roles</b></p>	<p>The lecturers organizing the course are actively acknowledging the four dimensions of teaching and learning:</p> <ul style="list-style-type: none"> <li>● Pedagogical dimension: The main course content is predominantly lectured by the organizing lecturers. However, during the group work, each group is supervised by additional researchers that are familiar with their research challenge. These interactions are mainly pedagogy-related. The organizing lecturers, consisting of (depending on time availability) research associates and a junior professor, is supervised by a professor of the university. The researchers supervising groups are often research associates and PhD candidates with current research questions.</li> <li>● Social dimension: The organizing lecturers have a prepared communication plan to engage with the student groups prior, during and after the seminar week. These are designed to ensure engagement and information flow to all students independent of their location.</li> <li>● Managerial dimension: The organizing lecturers actively manage the course, starting with enlisting research challenges from interested colleagues, ensuring interaction between the supervisors and their groups during the semester, and collecting the evaluation for the students after the course has ended. An ADMIN channel on the MS Teams room is used for inter-researcher communication.</li> <li>● Technical dimension: Technical issues can always arise when using digital platforms. The organizing lecturers are the first point of contact for students and supervising researchers and know relevant contacts in the IT support of the university.</li> </ul>

<p><b>Activities</b></p>	<p>The research seminar has two main intended learning outcomes:</p> <ul style="list-style-type: none"> <li>• Graduates can in research and science independently create scientific work, classify scientific theoretically own and others' research projects and results and critically evaluate them in terms of quality or benefit and apply scientific finding methods adequate to the situation, as well as create a research paper.</li> <li>• Graduates can explain research strategies, research designs, methods and approaches, and quality criteria in research.</li> </ul> <p>To achieve these goals, the research seminar starts with a one-week intensive block-seminar, where the students receive in-depth information on science, research strategies and different research methods. This is done through lecturer led classes, and individual viewings of recordings as well as supplemental short quizzes to assess one's understanding.</p> <p>During that week, students are also divided into small groups of up to 4. In those groups, they then work on a pre-defined research question posed by one of the supervising researchers. They have a first and potential second consultation session with that supervisor to clarify relevant open questions, define a research strategy and approach to answer the posed research question.</p> <p>Following this intensive week, which takes place at the very beginning of the semester, the student groups work on their project, with the option to have further consultations with their supervisor, prior to handing in their research work in the form of a paper.</p> <p>Throughout their research project, the course offers scaffolding and guidance in the form of a step-by-step digital whiteboard. Further digital tools for the research process such as licensed survey and quantitative and qualitative analysis tools are provided and introduced to the students.</p>
<p><b>Delivery: learning</b></p>	
<p><b>Student-centered approach</b></p>	<p>Students are given the opportunity and are supported in order to be pro-active and conscious in their learning journey. Various activities and in-course discussions promote active participation by all students. The small groups with close supervision enable students further.</p>
<p><b>Differentiation and Personalization</b></p>	<p>To an extent, students are given the opportunity to determine the time and pace of their learning journey. They get full access during and after the one-week course to the videos and readings. This also supports individual repetitions and recap while working on the individual master theses.</p> <p>Students have access to personalized support during their learning journey. They always have the option to contact their lecturers and supervisors in case of questions. However, the course structure and the whole study program advocates individual and peer-based solution inquiry and finding.</p>
<p><b>Assessment</b></p>	
<p><b>Approach</b></p>	<p>The course includes a sound assessment strategy, including both formative and summative assessments.</p> <p>Formative: Students have the voluntary option to participate in short quizzes after each section of their self-learning content. During the consultations, they can further validate their understanding of the learned content. The quizzes' results are anonymous and help the lecturers in further optimizing the course.</p> <p>Summative: The summative assessment is conducted in the form of a paper submitted by the student group to the supervisor who evaluates it based on a predefined evaluation template.</p>

<b>implementation</b>	<p>The quizzes are linked on the MS Teams course room platform and can be anonymously analyzed by the course organizers.</p> <p>The final paper is submitted in the form of a PDF, based on a word template supplied to the students.</p>
<b>Recognition</b>	
<b>Methods and tools</b>	<p>Recognition of the course comes in the form of 6 ECTS.</p>
<b>Supporting References</b>	
<b>Reference and Supporting Material</b>	<p>Module description: <a href="https://www.fh-muenster.de/msb/downloads/studiengaenge/master-international-marketing-and-sales/studierende/modulbeschreibungen/Research_Seminar.pdf">https://www.fh-muenster.de/msb/downloads/studiengaenge/master-international-marketing-and-sales/studierende/modulbeschreibungen/Research_Seminar.pdf</a></p>
	<p>Addendum(s)</p>
<b>Contact</b>	
<b>Contact Details for Further Information</b>	<p>Dominik Lappenküper / Act. Prof. Sue Rossano-Rivero</p>
	<p><a href="mailto:Dominik.lappenkueper@fh-muenster.de">Dominik.lappenkueper@fh-muenster.de</a></p> <p><a href="mailto:rossano@fh-muenster.de">rossano@fh-muenster.de</a></p>



## 3.2 Bulgaria: European Software Institute Centre Eastern Europe (ESI CEE)

<b>Title</b>	ESI CEE Agile trainings
<b>Institution</b>	ESI CEE
<b>Name of the Institution</b>	European Software Institute Center Eastern Europe
<b>Country</b>	Bulgaria
<b>Ownership</b>	Foundation
<b>HEI / VET</b>	VET
<b>Type of Education</b>	Professional
<b>National Accreditation</b>	No
<b>International Accreditation</b>	Kanban University Certificate
<b>Level of the case</b>	Course
<b>Typology</b>	
<b>Pedagogical Areas</b>	<p>Please select whether the case fits into the one or more of the following areas:</p> <ul style="list-style-type: none"> <li>● <b>Curricula design</b></li> <li>● <b>Delivery: teaching</b></li> <li>● <b>Delivery: learning</b></li> <li>● <b>Assessment (formative, summative)</b></li> <li>● <b>Recognition of competence, attainments of related learning outcomes</b></li> </ul>
<b>Curricula design</b>	
<b>Approach</b>	<p>The approach for delivering the Kanban System Design Course, specifically tailored for professional training, focuses on interactivity, simulations, and hands-on exercises to make the training practical and engaging for the participants. This approach is designed for both on-site and online delivery. Here's an overview of the approach:</p> <p>Learning Objectives and Audience:</p> <p>The course aims to teach participants the fundamentals of the Kanban method, provide practical experience through simulations, and guide them in designing and operating a Kanban system. The target audience includes project managers, product development teams, service teams, team leaders, scrum masters, product owners, software developers, testing professionals, and process improvement team members.</p> <p>Online simulation and Interactive Learning:</p> <p>A central component of the training is the sophisticated Team Kanban Simulation. This simulation employs Kanban practices using Kanbanize, a leading online software product for workflow management. During the simulation, participants engage with integrated business rules, run daily events, and reviews based on a business scenario. This hands-on experience allows participants to make decisions about work allocation, explicit policies, replenishment of new items, limiting work in progress, and more. This simulation offers practical insights into managing workflows and making informed decisions.</p> <p>Hands-On Exercises:</p> <p>Throughout the course, participants engage in interactive digital hands-on exercises. These exercises enable participants to build or improve upon a Kanban system that suits their specific business needs. This practical approach helps participants apply the concepts learned in the training to real-world scenarios.</p> <p>Course Content and Learning Outcomes:</p>

	<p>The course content is structured to cover essential Kanban concepts and their practical application within participants' organizational contexts. Participants learn about limiting work in progress, visualizing workflows, designing Kanban systems, defining replenishment and delivery cadences, coordinating with other teams, using metrics for workflow management, and more.</p> <p>The training emphasizes the benefits of Kanban, such as shorter delivery times, increased delivery capability, reduced waste, improved product and service quality, and stronger collaboration. Kanban's adaptability and compatibility with other frameworks make it applicable to a variety of teams and organizations.</p> <p>Conclusion</p> <p>By incorporating simulations, interactive exercises, and a practical focus, this approach ensures that participants gain a deep understanding of the Kanban method and acquire the skills needed to apply it effectively in their work environments.</p>
<p><b>Methods</b></p>	<p>Teachers are using "Training from the Back of the Room" method. The "Training from the Back of the Room" (TBR) is an instructional design approach that focuses on engaging participants through active learning, collaboration, and brain-friendly techniques. It encourages a shift from traditional lecture-style training to a more interactive and participant-centered approach. When applying the TBR method using digital platforms, the teachers adapt its principles to the online learning environment.</p>
<p><b>Planning</b></p>	<p>Educators gather to plan the Kanban System Design Course for each group of students. They review Kanban University's latest curriculum, refining it with real-world examples. Researching the audience, they tailor the content for diverse professionals – from project managers to developers.</p> <p>Transitioning online, they set up digital tools for engagement – simulations, breakout rooms, whiteboards, and polls. Their timeline balances activities and breaks for sustained attention, incorporating Q&amp;A for shared learning.</p>
<p><b>Delivery: teaching</b></p>	
<p><b>Preparedness</b></p>	<p>As the participants step into the virtual or onsite classroom for the Kanban System Design Course, they find a carefully curated environment designed to empower their learning journey. The educators have prepared a comprehensive set of guidelines and materials to ensure that each student can maximize their effectiveness during the course.</p> <p>Welcome and Orientation:</p> <p>At the outset, participants receive a warm welcome and a brief orientation. They're introduced to the digital platform's features, such as chat, video, and breakout rooms. This ensures that everyone is comfortable with the technology before diving into the content.</p> <p>Course Outline and Expectations:</p> <p>A clear course outline is provided, detailing the schedule, topics, and learning objectives. Students understand what to expect, allowing them to mentally prepare for the upcoming sessions.</p> <p>Digital Platform Guide:</p> <p>A user-friendly guide to the digital platform is shared. This guide covers technical aspects, such as how to navigate breakout rooms, use virtual whiteboards, participate in polls, run the simulations and ask questions. This empowers students to actively engage without any hesitations.</p> <p>Feedback Loop:</p> <p>An avenue for feedback is established, allowing students to provide input on the effectiveness of the guidelines, materials, and overall course experience. This continuous improvement loop enhances future iterations of the course.</p>

	<p>By providing comprehensive guidelines and materials, educators ensure that participants have the resources and confidence to be actively engaged, contributing to a rich and transformative learning experience during the Kanban System Design Course.</p>
<p><b>Roles</b></p>	<p>High level guidelines, mandatory content and teaching standards are provided by Kanban University. The teachers tailor those assets and provide simulations and additional resources.</p>
<p><b>Activities</b></p>	<p>The educators perform a number of activities to deliver the training:</p> <p>Course Introduction and Overview:</p> <ul style="list-style-type: none"> <li>● Provide an overview of the course objectives and structure.</li> <li>● Introduce the instructor and their credentials.</li> <li>● Explain the importance of Kanban in project and service management.</li> </ul> <p>Introduction to Kanban:</p> <ul style="list-style-type: none"> <li>● Present the fundamental concepts of Kanban and its origins.</li> <li>● Discuss how Kanban aligns with Lean principles and its benefits for adaptive organizations.</li> </ul> <p>Kanban Simulation with Kanbanize:</p> <ul style="list-style-type: none"> <li>● Dive into the Team Kanban Simulation using Kanbanize software.</li> <li>● Guide participants through applying Kanban practices in a simulated business scenario.</li> <li>● Facilitate daily events, reviews, and decision-making related to work allocation, policies, replenishment, and work in progress.</li> </ul> <p>Kanban Principles and Practices:</p> <ul style="list-style-type: none"> <li>● Explain the core principles of Kanban.</li> <li>● Discuss the practices such as workflow visualization, limiting work in progress (WIP), workflow management, explicit policies, feedback loops and collaborative improvement.</li> </ul> <p>Designing a Kanban System:</p> <ul style="list-style-type: none"> <li>● Discuss a case study</li> <li>● Teach participants how to design a Kanban system tailored to their business needs using STATIK approach.</li> <li>● Discuss aspects like defining classes of service, replenishment cadences, and delivery strategies.</li> <li>● Ask participants to develop Kanban System in groups making use of digital platforms.</li> </ul> <p>Interactive Hands-On Exercise: Workflow Visualization:</p> <ul style="list-style-type: none"> <li>● Conduct a hands-on exercise where participants learn to visualize their workflow using Kanban boards.</li> <li>● Guide participants in creating their own Kanban boards based on their specific contexts.</li> </ul> <p>Course Review and Q&amp;A:</p> <ul style="list-style-type: none"> <li>● Summarize key takeaways from the course.</li> <li>● Address any participant questions and clarify doubts.</li> <li>● Distribution of Course Materials:</li> </ul> <p>Closing Remarks and Future Steps:</p>

	<ul style="list-style-type: none"> <li>● Thank participants for their participation.</li> <li>● Encourage them to continue applying Kanban practices in their respective roles.</li> <li>● Provide information about additional training or resources for further skill development.</li> </ul>
<b>Delivery: learning</b>	
<b>Student-centered approach</b>	<p>The course focuses on participants' needs and engagement. In this Kanban course, it empowers learners by:</p> <ul style="list-style-type: none"> <li>● Using interactive exercises for hands-on learning.</li> <li>● Providing real world examples and case studies.</li> <li>● Adapting Kanban principles to participants' contexts including designing a Kanban System.</li> <li>● Encouraging collaboration and Q&amp;A.</li> <li>● Providing practical tools (Kanbanize) for real-world scenarios.</li> <li>● Prioritizing participant understanding and skill development.</li> </ul>
<b>Assessment</b>	
<b>Approach</b>	<p>Assessment Form for Fine-Tuning (First Session):</p> <p>In the first session, participants are asked about their experience with the course so far. The information is used to fine tune the approach for the other session, if needed.</p> <p>Fit-for-Purpose Evaluation Form (End of Training):</p> <p>At the end of the training, participants evaluate the course's relevance to their initial objectives. They assess how well the course helped them to achieve their specific learning objectives.</p>
<b>Implementation</b>	<p>Assessments are conducted through digital surveys accessible by web and mobile. A standard method for calculation and interpretation of fit-for-purpose score is applied.</p>
<b>Recognition</b>	<p>The course is certified by Kanban University globally and is highly appreciated by the industry.</p>
<b>Methods and tools</b>	<p>The key technologies to deliver the course are:</p> <p>MS Teams:</p> <p>Microsoft Teams serves as the primary communication and collaboration platform for the course. It facilitates real-time interaction between participants, the instructor, and other team members.</p> <ul style="list-style-type: none"> <li>● Live Sessions: The course schedule and links to live sessions are shared through MS Teams. Participants join the virtual classrooms at the specified times.</li> <li>● Lecture Delivery: The instructor conducts presentations, explains concepts, and engages in discussions through video and screen-sharing features.</li> <li>● Q&amp;A and Discussions: Participants can ask questions, seek clarifications, and engage in discussions using the chat and video call features.</li> <li>● Document Sharing: Course materials, resources, and related documents are uploaded to Teams for easy access by participants.</li> <li>● Collaborative Projects: Participants can collaborate on projects, assignments, and exercises within Teams, fostering teamwork.</li> </ul>

	<p><b>Mural:</b></p> <p>Mural is an online visual collaboration platform that enhances participant engagement through interactive activities and visual aids.</p> <ul style="list-style-type: none"> <li>● <b>Interactive Exercises:</b> Mural is used for hands-on activities where participants collaboratively work on tasks, such as designing Kanban boards or mapping workflows.</li> <li>● <b>Visualizations:</b> Kanban principles, workflows, and concepts are visually represented using Mural's interactive canvases.</li> <li>● <b>Brainstorming and Ideation:</b> Mural's virtual whiteboards enable participants to brainstorm, share ideas, and visually represent concepts.</li> <li>● <b>Group Work:</b> Participants can work in breakout groups within Mural, simulating real-world scenarios and promoting collaboration.</li> </ul> <p><b>Kanbanize:</b></p> <p>Kanbanize is an online software platform designed for workflow management and visualization. It's used to provide participants with hands-on experience of applying Kanban practices.</p> <ul style="list-style-type: none"> <li>● <b>Kanban Simulation:</b> Kanbanize hosts the Team Kanban Simulation, allowing participants to practice applying Kanban principles in a controlled environment.</li> <li>● <b>Business Scenarios:</b> Participants navigate the simulation's business scenarios, making decisions about work allocation, policies, replenishment, and managing workflows.</li> <li>● <b>Real-time Feedback:</b> Kanbanize provides real-time feedback on participants' decisions and actions, enhancing the learning experience.</li> <li>● <b>Practical Application:</b> Participants gain practical insights into using Kanban tools and practices, preparing them for real-world implementation.</li> </ul> <p>By integrating MS Teams, Mural, and Kanbanize, the course offers a comprehensive digital learning environment. Participants can engage in real-time discussions, interactive exercises, and hands-on simulations, ensuring a well-rounded and practical understanding of Kanban principles and their application.</p>
<b>Supporting References</b>	
<b>Reference and Supporting Material</b>	On-demand
<b>Contact</b>	
<b>Contact Details for Further Information</b>	<p>Name: Ivaylo Gueorguiev</p> <hr/> <p>Email: <a href="mailto:ivo@esicener.bg">ivo@esicener.bg</a></p>





### 3.3 Croatia: Algebra University College

<b>Title</b>	Algebra Internet Marketing
<b>Institution</b>	Algebra
<b>Name of the Institution</b>	Algebra University College
<b>Country</b>	Croatia
<b>Ownership</b>	Private
<b>HEI / VET</b>	HEI
<b>Type of Education</b>	Formal
<b>National Accreditation</b>	Yes (Agency for Science and Higher Education)
<b>International Accreditation</b>	No
<b>Level of the case</b>	Program
<b>Typology</b>	
<b>Pedagogical Areas</b>	Please select whether the case fits into the one or more of the following areas: <ul style="list-style-type: none"> <li>● <b>Curricula design</b></li> <li>● <b>Delivery: teaching</b></li> <li>● <b>Delivery: learning</b></li> <li>● <b>Assessment (formative, summative)</b></li> <li>● <b>Recognition of competence, attainments of related learning outcomes</b></li> </ul>
<b>Curricula design</b>	
<b>Approach</b>	<p>The curriculum of the short-cycle study program has been designed to be very flexible in order to be attractive and relevant to different groups of students. This can be viewed from several angles.</p> <p>First, admission is open to students who have completed any type of secondary education, including those who have completed a three-year school program and would not otherwise have the opportunity to pursue higher education. This was in response to recent changes in the law, which stipulate that only students who have completed a four-year secondary school education and passed the compulsory State Matura exams can be enrolled in bachelor's degree programs, while candidates who have completed a three-year secondary school program or have not passed the mandatory State Matura exams can be considered for admission to short cycle study programmes. With this profile of a potential student population in mind, the curriculum has been designed to support the transition to higher education and to enhance students' key competencies and basic skills, including mathematics, writing skills, and academic literacy.</p> <p>Second, the curriculum is designed to be broadly compatible with the curriculum of the Algebra University College Bachelor study programme in Digital Marketing. As a result, more ambitious students would have the opportunity to apply for the second year of the Bachelor study programme in Digital Marketing after graduation and continue their studies.</p> <p>Finally, the curriculum is designed to be suitable for both face-to-face and distance learning for part-time students. In this way, students living in remote parts of Croatia (in rural areas or on islands), student parents, or working students can have the opportunity to pursue higher education without having to move to urban centers or give up their jobs.</p> <p>With the short cycle study programme of Internet Marketing through a distance learning system Algebra University College provides access to quality education and the acquisition of relevant skills for employability to students who are located at different locations and who are employed and whose living conditions do not allow them attending classes in the classical form in Zagreb.</p>

<p><b>Methods</b></p>	<p>Teachers adopt <b>methodological frameworks</b> to design face-to-face, distance or blended courses, combining different teaching methods, media and tools according to the different learning outcomes.</p> <p>Teachers have access to the Algebra <b>Learning Management System</b> which is conceived for accommodating different types of teaching methods, media and tools and students' learning styles and activities.</p>
<p><b>Planning</b></p>	<p>Teachers prepare an accurate lesson/course plan for achieving the intended learning outcomes prescribed by the programme, as well as learning and teaching material. The schedule and timing of the activities are incorporated in the overall teaching plan of the institution while delivery methods and assessment methods are designed to correspond to the intended learning outcomes. A wide range of methods is envisaged following the existing institutional policy as well as teaching, learning and assessment tools of Algebra University College.</p>
<p><b>Delivery: teaching</b></p>	
<p><b>Preparedness</b></p>	<p>Students who enroll in the Study Program of Internet Marketing fully delivered online are provided with additional support in the form of assistance in the organization of their own work and maintaining continuous contact with teachers and other students as a measure of prevention of drop-out. The experience of implementing online adult education programs in the field of Internet marketing in the past 8 years has enabled Algebra University College to build such support systems and test their effectiveness on participants of different ages.</p> <p>Algebra University College offers guidelines and training to its teachers to get prepared for delivering digital learning according to specific standards.</p> <p>The delivery of the study programme is supported by the tools developed specifically for this purpose and for institutional support to teachers and students from the respective department. The following has been developed to support the online delivery of the study programme:</p> <ul style="list-style-type: none"> <li>● Instructions for the use of the Algebra University College Information System have been prepared for the teachers engaged in the delivery of the study programme;</li> <li>● Instructions for students to use the Algebra University College Information System have been prepared to access teaching and learning activities;</li> </ul> <p>Mentoring workshops are organized specifically for the group of students studying online.</p>
<p><b>Roles</b></p>	<p>Programme committee composed of teachers, heads of departments, students and alumni participated in the curriculum design of the study programme. Vice Dean for quality and development is responsible for the coordination of the design of the study programme and its delivery. The support is provided by the Department for the support in teaching.</p>
<p><b>Activities</b></p>	<p>The Algebra University College regularly, at least once a year, organizes a workshop entitled: Annual Meeting of Teachers and Associates of the Algebra University College, which is mandatory for all full-time employees and all external teachers and associates. The content and topics of the workshop provide information on quality approaches to the establishment of courses, exchange of best experiences, information on testing and testing methods, examples of good practices and innovation in teaching.</p> <p>The Algebra University College also conducts specialized workshops and training for all its teachers (permanently employed and external) and, if necessary, prepares additional materials to support teachers (manuals, video materials, e-learning materials...), and at the beginning of each semester organizes a workshop for all new teachers and associates who are introduced into teaching</p> <p>In addition to workshops and training that are carried out for all teachers and associates (full-time and external associates), the internal document "Guidelines for teaching and course setup" describes recommendations, working procedures and procedures for teaching in accordance with the internal quality assurance system.</p>

	The guidelines are also available in the form of video content that aims to enable teachers faster and simpler access to answers to questions related to some work procedures or procedures, which certainly represents a shift in the methodology of education of teachers and associates.
<b>Delivery: learning</b>	
<b>Student-centered approach</b>	<p>Students are given the opportunity and are supported in order to be proactive and conscious in their learning journey. The student-centered learning concept is characterized by:</p> <ul style="list-style-type: none"> <li>● learning opportunities tailored to the needs and capabilities of diverse learners</li> <li>● deployment of innovative methods of teaching, learning and assessment</li> <li>● empowering students to take active engagement as co-creators in all aspects of the learning experience</li> <li>● active learning and understanding with a reflexive approach to the teaching, learning and assessment process</li> <li>● increased responsibility, accountability and autonomy of the student</li> <li>● fostering transferable skills such as problem-solving, critical thinking and reflective thinking.</li> </ul>
<b>Assessment</b>	
<b>Approach</b>	<p>Teachers use assessment as a learning opportunity for students, including both formative and summative assessment methods</p> <p>Teachers present in the course description the assessment approach, methods, criteria and source of verification foreseen</p> <p>Students' <b>privacy rights</b> are regarded as a priority in managing learning analytics and teachers are aware of GDPR requirements for the treatment of sensible and personal data.</p>
<b>Implementation</b>	<p>Teachers use a combination of methods and tools to deliver the assessment.</p> <p>Teachers collect relevant information via learning analytics to perform part of the assessment.</p>
<b>Recognition</b>	Academic recognition (recognition of prior formal learning), and recognition of non-formal, certified and informal learning are possible following the internal regulation of Algebra University College. This is incorporated into the internal quality assurance system of the institution.
<b>Methods and tools</b>	<p>Technologies used to communicate with students and to deliver the course is assured following the national criteria as set up by the National Council for Science, Higher Education and Technological Development as follows:</p> <p>Permanent (24/7) Internet access from the institution is ensured as well as constant access to servers at the institution from remote locations;</p> <p>Computer equipment and software support is provided: on-campus - excellent internet connection that ensures a stable connection for 1,200 connected devices at the same time, speed of 10Gbps. A data center called "Nimbus" supports 4,000 virtual computers for students. It has 1.62 THz CPU power, 5TB memory and about 40TB of disk space, and consists of 80 physical servers. As part of the server infrastructure, the Boston Super Server SMC 1029GQ-TRT supercomputer was installed, which is mostly used in data science studies, and the server room is equipped with a 60 kVA UPS and a separate NOVAC fire extinguishing system, which is environmentally friendly and has low ozone harm. As an Authorized Education Centre for Microsoft, Adobe, Cisco, Autodesk, IBM, RedHat, ECDL, VMware ... Algebra Group has licensed complete software on all workstations used in teaching, namely user software, server solutions (Microsoft Servers, MS SQL, ISA, Exchange) as well as development software (Visual Studio, Java development tools...). MS Teams (service in the external cloud licensed within our Microsoft partner status), Moodle, Infoeduka (service in the private</p>

	<p>external cloud,) and online exam systems: Proctorexam.com (external cloud service paid to the manufacturer Turnitin) and Exam.net (external cloud service paid to the manufacturer) and Exam.net (service in the external cloud paid to the manufacturer Exam.net).</p> <p>A virtual environment is provided in which online classes are conducted. The design of the programme is based on a good experience of delivery of a training programme for adult learners accredited in 2014 with more than a thousand participants of this program who have attended classes online in the past eight years and is based on: infrastructure and online classrooms from which online classes are transmitted (online cabinets), a mentoring approach and support for online students, two-way live streaming of online classes to students, with the possibility of viewing recordings of missed lectures subsequently (asynchronously), online support to study through the Moodle system (seminar papers, joint assignments, collaboration, teaching materials...), online support to study through the Infoeduka system (administrative support to study, online library, a repository of teaching documents (presentation from lectures, exercises, assignments, instructions, ...), conducting exams under controlled conditions in our branches throughout Croatia using the system of Exam.net and ProctorExam.com, respecting the same conditions for ensuring the quality of exam implementation as for students in the classical program.</p> <p>Computer services required for students and teachers to perform the envisaged activities are provided (e.g. user email account at the institution, online library access, user account for LMS, wiki or other environments, user accounts in the AAI domain to access a wider range of services offered in the educational system, etc.)</p>
<b>Supporting References</b>	
<b>Reference and Supporting Material</b>	On-demand
<b>Contact</b>	
<b>Contact Details for Further Information</b>	<p>Name: Ana Tecilazić, PhD, Secretary General</p> <hr/> <p>Email: <a href="mailto:ana.tecilazic@algebra.hr">ana.tecilazic@algebra.hr</a></p>



### 3.4 Italy: Politecnico di Milano

<b>Title</b>	Politecnico di Milano
<b>Institution</b>	Politecnico di Milano
<b>Name of the Institution</b>	Politecnico di Milano
<b>Country</b>	Italy
<b>Ownership</b>	Public
<b>HEI / VET</b>	HEI
<b>Type of Education</b>	Formal
<b>National Accreditation</b>	No / Yes (please provide the name of accreditation authority)
<b>International Accreditation</b>	No / Yes (please provide the name of accreditation authority)
<b>Level of the case</b>	
<b>Typology</b>	
<b>Pedagogical Areas</b>	<p>Please select whether the case fits into the one or more of the following areas:</p> <ul style="list-style-type: none"> <li>● <b>X Curricula design</b></li> <li>● <b>X Delivery: teaching</b></li> <li>● <b>X Delivery: learning</b></li> <li>● <b>X Assessment (formative, summative)</b></li> <li>● <b>X Recognition of competence, attainments of related learning outcomes</b></li> </ul>
<b>Curricula design</b>	
<b>Approach</b>	<p>Digital learning has been implemented by the Politecnico only after the outbreak of the Covid-19 pandemic as a result of the need to comply with legal provisions. After the end of the most serious phase of the pandemic, the Politecnico has switched to a transition phase of blended learning, especially for students from foreign countries attending the master courses who could not leave their country of origin. As a consequence of the end of the restrictions, the institution has opted for returning to traditional learning, although with a different degree of consciousness regarding the potential integration of digital and online approaches in the traditional training setting.</p> <p>The potentialities of such integration are now clearly flagged by the organization, although some criticalities have been detected. During the emergency phase, students have generally demonstrated to highly appreciate the availability of online options which allow a higher degree of flexibility and personalization, leading the institution to a reflection about the risk of a progressive loss of the social dimension of the didactic activities. Hence the decision to go back to traditional training as a standard solution.</p> <p>There is not currently an official position from the Politecnico regarding digital learning which cannot be regarded as a standard approach. As a matter of fact, the recourse to digital learning has been bound to the emergency phase of the pandemic, but an ongoing debate is taking place about the use of such an approach in the long run.</p>

	<p>Instructional design is provided to design courses and program. A specific web-based tool has been created for this purpose. Its name is Metid (<a href="https://www.metid.polimi.it">https://www.metid.polimi.it</a>), whose acronym means “innovative methodologies and technologies for the didactics”. Metid is the Innovation Teaching and Learning Task Force of the Politecnico di Milano, which designs and tests tools and methods for learning innovation and faculty development. It is the main source to which teachers can resort in order to develop MOOCs and receive both technical and methodological assistance. Among Metid tasks, to be mentioned is teachers’ training as well as their involvement in the adoption of innovative methodologies and the promotion of results’ monitoring (see the program “Beyond flipped classroom”). Among the methodologies suggested by Metid for designing and developing innovative training courses, it is possible to find both suggestions for online and traditional teaching. As a whole the support provided by Metid for the instructional design phase is 20% instrumental and 80% methodological. Among the activities which have been encouraged to support teachers in the design phase, simulations of online didactic and group works have been foreseen.</p> <p>Teachers are not compelled to encompass the Metid suggestions for instructional design. They are just a further possibility which is offered to them by the institution.</p> <p>The recourse to specific methodological frameworks is not officially forecasted, although some methodological frameworks are used by the respondent as:</p> <ul style="list-style-type: none"> <li>● SAM (Successive Approximation Model).</li> <li>● Merrill's First Principles of Instruction.</li> </ul> <p><b>Methods</b></p> <p>A Learning Management System has not been officially set up for the delivery of different types of teaching methods. The reason is that the institution was ready to cope with the switch to online learning well before the outbreak of the pandemic. This is true for what regards students, who are generally high-skilled in technology, but also for what concerns teachers, who could boast of previous on the field experiences in the management of online training. These experiences had been conducted on a voluntary basis through virtual simulations in which teachers were asked to simulate virtual training activities along with colleagues and students.</p> <p>The technological equipment and preparedness of the institution has increased in the course of the Covid 19 emergency, paving the way for the incorporation of new digital tools in the traditional training activities. The more than 300 classrooms of the Politecnico are now equipped with a console for checking from the desk the development of the didactic activity in all its components (projectors, lights, blackboards, LIMs, ecc). Moreover, trainers can rely upon a virtual room on Webex from which they can have a full control of the digital devices of which students make use. The emergency has boosted the adoption of digital solutions which have been initially experimented and then formally adopted in the teaching practice. Today students can interact with the trainer directly from their PC workstation which offers higher resolution while enabling a higher degree of participation and involvement.</p> <p>Currently the Politecnico can count on a specific programme for monitoring and enhancing the innovation of the didactic methods whose name is “Innovative teaching”, which represents a platform for potentially overcoming the frontal lesson approach.</p>
<p><b>Planning</b></p>	<p>Students are provided with systemic procedural scaffolding in order to enhance their participation and centrality in the didactic activities. Scaffolding does not consist in technical support, since they boast of a high degree of technical skills as regards the use of devices, platforms, ecc. The scaffolding activity is provided thorough instructions which are given in the course of a specific lesson preliminary to the training courses. During this lesson they receive all the practical instructions, also by means of infographics and digital materials, which will put them in the conditions to better participate in the training activities. A specific platform, named WEbeep, is used for this purpose.</p>

	<p>Each course is associated with a platform which can be used for uploading materials and communicating with the other students and the teachers, usually by means of forums and blogs. These platforms can be well used by students to upload their materials, to post suggestions and to re-elaborate the training materials and contents. The instructions for the use of these platforms are extremely relevant especially for the engagement of foreign students who come from cultures where training activities are still mainly based on the concept of teacher's centrality, which is perceived as essential, making for them more difficult to adapt to horizontal learning methodologies.</p>
<b>Delivery: teaching</b>	
<b>Roles</b>	<p>The four dimensions of online teaching and learning process (didactic, managerial, social and technological) are acknowledged by the institution staff.</p>
<b>Activities</b>	<p>Content curation and creation is partly centralized and based on the availability of an institutional repository where teachers can find all the materials officially released by the Politecnico. Such materials are generally used for designing MOOCs and made available also on the internet site. In addition to that, teachers can draw on the selection of training materials which are collected through the institutional network of the Politecnico, including, for example, the MIT in Boston which disposes of a specific platform for knowledge sharing.</p> <p>The scientific community and each teacher can co-create and produce specific contents based on their needs. These are usually the less structured materials which are elaborated and developed through the internal channels or Youtube which are exploited for sharing the contents with the students' community.</p> <p>The scaffolding activity is restricted to the procedural instructions.</p>
<b>Delivery: learning</b>	
<b>Student-centered approach</b>	<p>Student-centered approach is clearly promoted by the institution in different ways. The role of the teacher is more and more associated with that of a facilitator who gives the proper inputs on specific topics to progressively leave the ground to students' participation and interaction. In such a frame, students are not simply contents' receivers, but co-creators, who can take the initiative co-leading the activities with a peer-to-peer approach. Students' centrality is remarked by the fact that some activities are suggested by them. To this aim, a forum to which they can resort has been created.</p> <p>Proactivity goes along with a higher level of satisfaction which has been enhanced by the recourse to digital tools which promote the participation and the interaction (a clear improvement has been recorded in this regard in comparison with the pre-Covid phase when digital interactions were poor). The active participation of students in the co-creation of contents has the further advantage to enhance the adaptation and knowledge on teachers' side. A potential critical factor hampering these potentialities is represented by the internal spaces of the Politecnico which have been conceived for a traditional teacher-centered learning approach.</p>

<b>Differentiation and Personalization</b>	Learning experience is adapted to the specific needs and interests of students. A particular attention is devoted to the sphere of the cultural differences, especially for what regards students coming from different cultural contexts who have a divergent concept of authority and teaching styles. Such a challenge is commonly overcome by means of personalized support, both at cultural and practical level.
<b>Assessment</b>	
<b>Approach</b>	<p>Assessment strategies are provided for evaluating the impact of new technologies on the training experience. The results have been highly positive, resulting in a general improvement in the level of engagement, commitment and participation. Assessment evaluations are commonly carried on during the courses to assess the degree of competences and skills acquired by the students while the training is still taking place. Such assessment procedures are based both on individual and group activities which put the students in the condition to better understand their level of learning. A further assessment is foreseen in the admission phase and takes place directly during the day in which students receive the instructions for their enrolment.</p> <p>Learning analytics have been used to track students' activities during the Covid-19 emergency. In that circumstance, no specific guidelines have been given to the teachers from the institutional level. Currently, learning analytics are not tracked: the focus is on the interaction, not on the control and learning analytics are not used for the assessment phase. Specific control activities are foreseen at digital level just during the exams, consisting of privacy protection measures and prohibition of online connections.</p>
<b>Implementation</b>	Assessment procedures are not based on the results of learning analytics collection.
<b>Recognition</b>	
<b>Methods and tools</b>	<p>Micro-credentials are used for certifying the competences acquired in the course of specific and short programmes like the "Green and digital ambassador". As a result of the participation in this programme, students receive micro-credentials which are also used in order to certify the competences resulting from the attendance of transversal courses.</p> <p>Micro-training is commonly delivered for the upgrade of specific competences of CCS students who require further credits in addition to the traditional certification. It is also used for the delivery of transversal and cross-functional training courses which are open to the participation of students coming from different areas and bound to provide integrative and transversal competences. A further advantage of these courses is to promote a cross-functional approach, overcoming the internal barriers among different faculties, while enhancing a multidisciplinary approach. Their disadvantage is linked to the fact they can become an excessive burden for those students who are already engaged in challenging and demanding training paths. This is the reason because just a few students have access to them.</p>
<b>Supporting References</b>	
<b>Reference and Supporting Material</b>	On-line link



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	Telephone





### 3.5 Italy: ITS Mobilità (Case Nuove, Varese)

<b>Title</b>	ITS Lombardo Mobilità Sostenibile, Case Nuove (VA)
<b>Institution</b>	ITS Lombardo Mobilità Sostenibile, Case Nuove (VA)
<b>Name of the Institution</b>	
<b>Country</b>	Italy
<b>Ownership</b>	Private, using public funds
<b>HEI / VET</b>	Higher VET
<b>Type of Education</b>	Formal
<b>National Accreditation</b>	No / Yes (please provide the name of accreditation authority)
<b>International Accreditation</b>	No / Yes (please provide the name of accreditation authority)
<b>Level of the case</b>	
<b>Typology</b>	
<b>Pedagogical Areas</b>	<p>Please select whether the case fits into the one or more of the following areas:</p> <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> <b>Curricula design</b></li> <li><input checked="" type="checkbox"/> <b>Delivery: teaching</b></li> <li><input checked="" type="checkbox"/> <b>Delivery: learning</b></li> <li><input checked="" type="checkbox"/> <b>Assessment (formative, summative)</b></li> <li><input checked="" type="checkbox"/> <b>Recognition of competence, attainments of related learning outcomes</b></li> </ul>
<b>Curricula design</b>	
<b>Approach</b>	<p>The advantages and potential of digital learning have been clearly acknowledged by the school both at didactic and laboratory level. As widely recognized, the outbreak of the Covid 19 pandemic has boosted the deployment of digital tools at strategic as well as pedagogical level, enhancing the embedding of digital technologies in the ordinary training practice.</p> <p>The structural shift to digital pedagogy has been highly appreciated by the companies which are represented in the ITS Foundation, principally because of the possibility to better match didactic activities with companies' internal training methodologies. The increasing digitalization has been regarded as an added value also by small companies. The reason is that the new skills enhanced by digital training are usually considered as a spur for purchasing new and more innovative technologies and machineries, thus contributing to the development of more innovative and profitable business models and solutions.</p>

<p><b>Methods</b></p>	<p>Didactic methods are modeled based on local needs and requirements and then implemented by trainers who remain the real promoters of the adoption of traditional as well as new pedagogical methodologies. While taking on this role, teachers are supported and monitored by tutors, who act as a bridge between them and the students, giving a contribution also in terms of bringing students' needs and suggestions to their attention. Tutors' role is of paramount importance also with regard to the instructional design (see glossary) activities, since they act as project managers supporting teachers in the training design phase. Instructional design models as ADDIE are not currently used.</p> <p>Digital learning management systems (LMS) (see glossary) as Moodle are not officially used. Trainers are accustomed to rely upon the Google suite for collaborative learning which offers services as shared calendars, online documents editing and storage, video meetings, forums, etc. A further tool they can exploit is an internal operational system, named GEOP (produced by Arvea srl), which is helpful for managing the relations with companies as well as to monitor the stages' opportunities and so on.</p> <p>With regard to learning sessions unfolding in the frame of EU-granted projects, the use of collaborative platforms like TEAMS is very common. To be mentioned is that most of the training activities are currently held in presence.</p>
<p><b>Planning</b></p>	<p>Procedural scaffolding (see glossary) is systematically provided in order to help students to benefit from digital learning experiences. In such a frame, tutors can play a key-role in supporting students to effectively access and participate in digital activities. Scaffolding is mainly restricted to procedural support, while conceptual, strategic and metacognitive scaffoldings are not still prioritized.</p>
<p><b>Delivery: teaching</b></p>	
<p><b>Preparedness</b></p>	<p>The majority of teachers come from companies, although the ITS provides guidelines and training to enable them to deliver digital learning according to specific standards. In this frame, trainers' pedagogical approach is principally committed to cope with the needs and aims rising from the companies.</p> <p>Students' preparedness is supported by the institutional tutors who introduce them to the learning environment, while acting as a bridge between them and the trainers. Tutors play a key role also in contributing to collaborative learning, promoting the exchange of information and feedback with a peer-to-peer approach.</p>
<p><b>Roles</b></p>	<p>New roles, competences and dimensions of digital pedagogy are clearly recognized by the institution, even though a continuous effort is required in order to encourage teachers' adaptation to the new standards. As a result of that, a better awareness of the new roles can be regarded as a work in progress, which benefits from the construction of ongoing partnerships with the external ecosystem (companies, training centers, etc.)</p> <p>Teachers' role is mainly based on a bottom-up approach, aimed at ensuring a real match between competences, contents and rising challenges coming from the companies' ecosystem. For this reason, training paths are subjected to a never ending work of adaptation, taking place in cooperation with companies which play a key-role also in the definition of training contents. An example of that are the cases of students who come back from stages with new ideas and suggestions for the adaptation and amendments of didactic contents and activities.</p>

<p><b>Activities</b></p>	<p>The “ITS Lombardo Mobilità Sostenibile” (ITS stands for Technical Superior Institute), based in Case Nuove (VA), consists of three main sectors: aeronautics, logistics and mechatronics.</p> <p>Activities vary depending on the fact they are based on traditional or laboratory settings. As regards class-based training, contents are made available through content management systems as clouds (Drive), where materials can be uploaded and adapted based on the experiences of the previous years. Moreover, each training course can benefit from a contents’ folder which is shared through Drive or OneDrive.</p> <p>Teachers do not structurally resort to Open Educational Resources (see glossary), whose exploitation is left to the individual choice.</p>
<p><b>Delivery: learning</b></p>	
<p><b>Student-centered approach</b></p>	<p>Students are supported in order to be proactive and conscious in the course of their learning path. In so doing, the institution makes efforts to enhance a student-centered approach which is supported by specific roles as the one of the class tutor, who is used to manage calendars, to help students better familiarize with each other and to promote their active participation in the design and fine-tuning of the learning process. He/she can be regarded as a real facilitator of the digital learning process, although his/her role is not limited to the technical support, but encompasses a wide array of activities ranging from personal support to peer-to-peer interactions, etc.</p>
<p><b>Differentiation and Personalization</b></p>	<p>Learning analytics are not regularly collected and used in order to better finalize and personalize the training experience based on students’ individual traits and aptitudes. A great attention is devoted to the challenge of managing diversity and personalizing the learning experience. To be responsible for these tasks is always the tutor who is expected to effectively cope with this challenge, while safeguarding students’ privacy rights and sensible personal data. When dealing with cases of diversities, the main target of “ITS Mobilità” is team-working, involving the tutor, the counselor, the coordinator and the general director. Each case is tackled with the greatest attention, taking care of the inclusive aspects.</p> <p>No guidelines are still available in terms of privacy rights because ITS foundations are not still required to be compliant with these obligations.</p> <p>-</p>
<p><b>Assessment</b></p>	
<p><b>Approach</b></p>	<p>Teachers use assessment as a learning opportunity for students and for themselves, submitting both formative and summative assessment methodologies.</p>
<p><b>Implementation</b></p>	<p>The implementation of the assessment phase consists of the submission of a yearly monitoring questionnaire aimed at checking students’ degree of satisfaction in regard to the learning experience. Questionnaires concern the evaluation of training methodologies and modules as well as the degree of coherence between the acquired skills and the selected working sector in which the student is expected to operate.</p> <p>-</p>
<p><b>Recognition</b></p>	

<b>Methods and tools</b>	Recognition methods are still based on traditional certifications, even though micro-credentials are used based on CEDEFOP recommendations as well as on the good practices of other VET providers. -
<b>Supporting References</b>	
<b>Reference and Supporting Material</b>	<b>On-line link</b>
	<b>Addendum(s)</b>
<b>Contact</b>	
<b>Contact Details for Further Information</b>	<b>Name</b> Carlo Pace
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	<b>Telephone</b>



## 4. Addendum 1

### Pedagogical case template

Title	Name of the case
<b>Institution</b>	
<b>Name of the Institution</b>	
<b>Country</b>	
<b>Ownership</b>	Public / Private
<b>HEI / VET</b>	VET
<b>Type of Education</b>	Formal, Informal and/or Non-formal
<b>National Accreditation</b>	No / Yes (please provide the name of accreditation authority)
<b>International Accreditation</b>	No / Yes (please provide the name of accreditation authority)
<b>Level of the case</b>	Institutional/Program/ Course
<b>Typology</b>	
<b>Pedagogical Areas</b>	<p>Please select whether the case fits into the one or more of the following areas:</p> <ul style="list-style-type: none"> <li>● Curricula design</li> <li>● Delivery: teaching</li> <li>● Delivery: learning</li> <li>● Assessment (formative, summative)</li> <li>● Recognition of competence, attainments of related learning outcomes</li> <li>●</li> </ul>
<b>Curricula design</b>	
<b>Approach</b>	<ul style="list-style-type: none"> <li>● The potential of Digital learning as means for flexibility and personalization of learning plans, for empowerment of student as active learners and for professionalization of teacher is clearly flagged by the educational organization</li> <li>● The benefits of digital learning are communicated within and outside the educational organization and it is adopted as a “standard” approach (not just as emergency option) within the training offer of the educational organization (i.e. it is explicitly mentioned in the school strategic and operational document, in their web site, ect)</li> </ul>



<p><b>Methods</b></p>	<ul style="list-style-type: none"> <li>• Teachers adopt a specific <b>instructional design method</b> (i.e. EDDIE or others – see Glossary) to design their programmes.</li> <li>• The model is officially adopted by all the teaching staff and departments of the educational organization.</li> <li>• Teachers adopt specific <b>methodological frameworks</b> (i.e. the Conversational framework or others – see Glossary) to design digital or blended courses, combining different teaching methods, media and tools according to the different learning goals to be pursued.</li> <li>• Teachers have access to a <b>Learning Management System</b> (see Glossary) which is conceived for accommodating different types of teaching methods, media and tools and students’ learning styles and activities.</li> </ul>
<p><b>Planning</b></p>	<ul style="list-style-type: none"> <li>• Teachers prepare an accurate lesson/course plan for students including learning goals, contents, delivery methods, schedule and timing of the activities, assessment methods and envisaged recognition.</li> <li>• The educational organization and teachers systematically provide the students with <b>procedural scaffolding</b> (see glossary) to help them to take part and to benefit from the digital course.</li> </ul>
<p><b>Delivery: teaching</b></p>	
<p><b>Preparedness</b></p>	<ul style="list-style-type: none"> <li>• The educational organization offers guidelines or training to its teachers to get prepared for delivering digital learning according to specific standards.</li> </ul>
<p><b>Roles</b></p>	<ul style="list-style-type: none"> <li>• The <b>four dimensions of the teaching and learning process mediated by digital technologies</b> (see Glossary) are acknowledged, included in the course activities and properly managed by competent staff.</li> <li>• Clear roles over the four dimensions are assigned and the course/programme is managed by a team (describe who is doing what and job titles of the staff involved).</li> </ul>
<p><b>Activities</b></p>	<ul style="list-style-type: none"> <li>• Teachers use different <b>teaching methods</b> according to the learning goal they intend to achieve.</li> <li>• Teachers curate the selection, co-create or produce and use different types of <b>contents</b> (including OERs) in order to address different learning styles.</li> <li>• Teachers make use of different digital <b>tools</b> (including OERs) according to specific activities and learning goals to be pursued.</li> <li>• Teacher provides systematically to the student conceptual, strategic and metacognitive <b>scaffolding</b> (see glossary) to help them along their learning path.</li> </ul>
<p><b>Delivery: learning</b></p>	
<p><b>Student-centered approach</b></p>	<ul style="list-style-type: none"> <li>• Students are given the opportunity and are supported in order to be pro-active and conscious in their learning journey.</li> </ul>

<p><b>Differentiation and Personalization</b></p>	<ul style="list-style-type: none"> <li>• Students are given the opportunity to determine the time and pace of their learning journey.</li> <li>• Students are given access to a variety of contents and activities according to their specific interests and knowledge.</li> <li>• Students have access to personalized support during their learning journey.</li> </ul>
<p><b>Assessment</b></p>	
<p><b>Approach</b></p>	<ul style="list-style-type: none"> <li>• Teachers devise a sound <b>assessment strategy</b> (see Glossary) for the course.</li> <li>• Teachers use assessment as a learning opportunity for students, including both formative and summative assessment methods.</li> <li>• Teachers present in the course description the assessment approach, methods, criteria and source of verification foreseen</li> <li>• <b>Learning analytics</b> are designed by the course team to track students' activities, progress and learning achievements in consistency with the assessment strategy.</li> <li>• Students' <b>privacy rights</b> are regarded as a priority in managing learning analytics and teachers are aware of GDPR requirements for the treatment of sensible and personal data.</li> </ul>
<p><b>Implementation</b></p>	<ul style="list-style-type: none"> <li>• Teachers use a combination of methods and tools to deliver the assessment.</li> <li>• Teachers collect relevant information via learning analytics to perform part of the assessment.</li> </ul>
<p><b>Recognition</b></p>	
<p><b>Methods and tools</b></p>	<ul style="list-style-type: none"> <li>• The course includes <b>recognition methods</b> for certifying learning attainments and competence developed.</li> <li>• Teachers feel at ease in the use of <b>micro-credentials</b>, professional certifications and digital badges as key-instruments for supporting and fostering the upskilling and reskilling of students' competences.</li> <li>• Teachers regard micro-credentials as a <b>targeted, sustainable and tailored approach</b> to the recognition of competences, responding to the need of a transformation of training and learning approaches aligned with the challenges of the dual transition.</li> <li>• Teachers are used to exploit micro-credentials along with <b>micro-training</b>, breaking down the know-how into several small "pieces" to which it is linked a micro-certification for the recognition of specific competences.</li> <li>• Teachers are aware of the EU and international <b>standards as regards competences</b> and are capable of steering the recognition process to them.</li> <li>• Teachers know what <b>elements</b> must be included in micro-credentials and recognition certificates and how to <b>deliver</b> them in classroom-based, online or blended settings.</li> </ul>
<p><b>Supporting References</b></p>	
<p><b>Reference and Supporting Material</b></p>	<p>On-line link</p>



	Addendum(s)
<b>Contact</b>	
<b>Contact Details for Further Information</b>	Name
	Email
	Telephone



## 5. Addendum 2

### List of Definitions

<b>Assessment Strategy</b>	<p>Is the combination of methods and tools adopted by a teacher to assess the progress of students and to facilitate the achievement of the learning goals set in the course.</p> <ul style="list-style-type: none"> <li>● Formative assessment is to monitor student learning in order to provide ongoing feedback that can be used by teachers to improve their teaching and by students to improve their learning (i.e. rubrics, self-assessment, ect).</li> <li>● Summative assessment is to evaluate student learning at the end of an instructional unit or a course by comparing it against some standard or benchmark (i.e. text, exams, final assignments, ect).</li> </ul>
<b>Digital contents</b>	<p>Digital content is a 'catch all' term that encompasses text-based and audio-visual resources including those directly produced by the teacher; or by other authors and rendered available as OERs (Open Educational Resources). OERs are Teaching, learning and research materials in any medium, digital or otherwise, that reside in the public domain or have been released under an open license that permits no-cost access, use, adaptation and redistribution by others with no or limited restrictions.</p> <p>Source definition: <a href="#">UNESCO</a></p>
<b>Digital tools</b>	<p>ICT tools, both proprietary and OERs, that can assist teachers to enable students learning in a digital setting.</p> <p>Different kinds of tools can be used for supporting the achievement of different type of learning outcomes.</p> <p>Adapted from: Literature review</p>
<b>Educational organization</b>	<p>The term has multiple meanings according to the settings in which it is applied and often it is used interchangeably with the term 'educational institution' (e.g. European Commission, 2013b). In the context of the DigiCompEdu study the term <i>educational organization</i> refers primarily to primary, secondary and VET schools as well as higher education institutions such as Universities, University Colleges and Polytechnics</p>
<b>Four dimensions of the teaching and learning process mediated by digital technologies</b>	<ul style="list-style-type: none"> <li>● pedagogical dimension refers to pedagogical and assessing tasks</li> <li>● social dimension refers to interpersonal and communication tasks with the goal to make students feel closer despite the physical distance (perceived proximity) and to facilitate their learning path and achievement of learning goals</li> <li>● managerial dimension refers to administrative and organization tasks</li> <li>● technical dimension refers to technological tasks</li> </ul> <p>Adapted from: Literature review</p>
<b>Instructional Design methods</b>	<p>The theory and practice of design, development, utilization, management, and evaluation of processes and resources for learning</p> <p>Source: <a href="#">Association for educational Communication and technologies</a></p>
<b>Learning Management System</b>	<p>Learning management systems (LMS) integrate interactive learning environments and administration and facilitate customized online instructional materials. An LMS is a web-based software application using a database on which various types of information are stored. Comprehensive drag-and-drop tools enable instructors to easily create their</p>

<p><b>Methodological framework for digital learning</b></p>	<p>individual online courses. Administration of instructors, users, courses, and content is centralized and automated within an LMS. More than 200 different commercial and open source LMS products are currently available.</p> <p>Source: <a href="#">Encyclopedia of the sciences of learning</a></p> <p>A methodological framework is a tool to guide the training designer through a sequence of steps to complete the design of a course. It is based on a concerned learning theory (cognitivism, constructivism, connectivism, behaviorism).</p> <p>Adapted from: Literature review</p>
<p><b>Recognition method</b></p>	<p>The term “recognition method” refers to how competences and know-how acquired by students are recognised by institutions providing training courses by means of different kinds of certifications. Certification types can vary, ranging from traditional professional certificates or cards, to digital/open badges, academic certificates, nano-degrees, micro masters...</p> <p>What usually distinguishes the different kinds of certification is the focus on specific rather than on general competences. Micro-credentials and digital badges are usually exploited to certificate specific and small competences, while traditional and academic certificates are aimed at recognising a broader set of competences.</p> <p>Adapted from: Literature review</p>
<p><b>Scaffolding</b></p>	<p>Scaffolding refers to the support provided to students by teachers or instructors via technology before, during and after the digital learning course. Four main types of scaffolding can be identified:</p> <ul style="list-style-type: none"> <li>● procedural scaffolding – to help students access and participate to online activities</li> <li>● conceptual scaffolding – to help students prioritize fundamental concepts</li> <li>● strategic scaffolding – to suggests students alternative ways to tackle problems in learning</li> <li>● metacognitive scaffolding – to help students reflecting on their learning process</li> </ul> <p>Adapted from: Literature review</p>
<p><b>Staff</b></p>	<p>Refers to staff in all categories, involved directly or indirectly in formal educational settings. Job titles include, ‘teacher’, ‘tutor’, ‘academic’, ‘lecturer’, ‘faculty’, ‘trainer’, ‘mentor’, ‘coach’ and also include support roles such as ‘librarian’, ‘ICT support’, ‘eLearning support’ and those in management/leadership roles, ‘principals’, and ‘rectors’.</p>
<p><b>Students</b></p>	<p>Refers to persons of any age who are engaged in a formal educational process (course or program). Students are often referred to as ‘learners’, although this term is potentially broader, as it can refer to learning in both formal and informal settings</p>



## Teaching methods

Teaching method is a specific way used by teachers to enable students learning.

Divided into

- Teacher-centered (i.e. lectures, flipped class-room). Teachers serve as instructor/authority figures who deliver knowledge to their students through lectures and direct instruction, and aim to measure the results through testing and assessment. This method is sometimes referred to as “sage on the stage.”and
- Student-centered (i.e. inquiry-based learning, collaborative learning and self-regulated learning) Teachers still serve as an authority figure, but may function more as a facilitator or “guide on the side,” as students assume a much more active role in the learning process. In this method, students learn from and are continually assessed on such activities as group projects, student portfolios and class participation

Source: [University of San Diego](#)